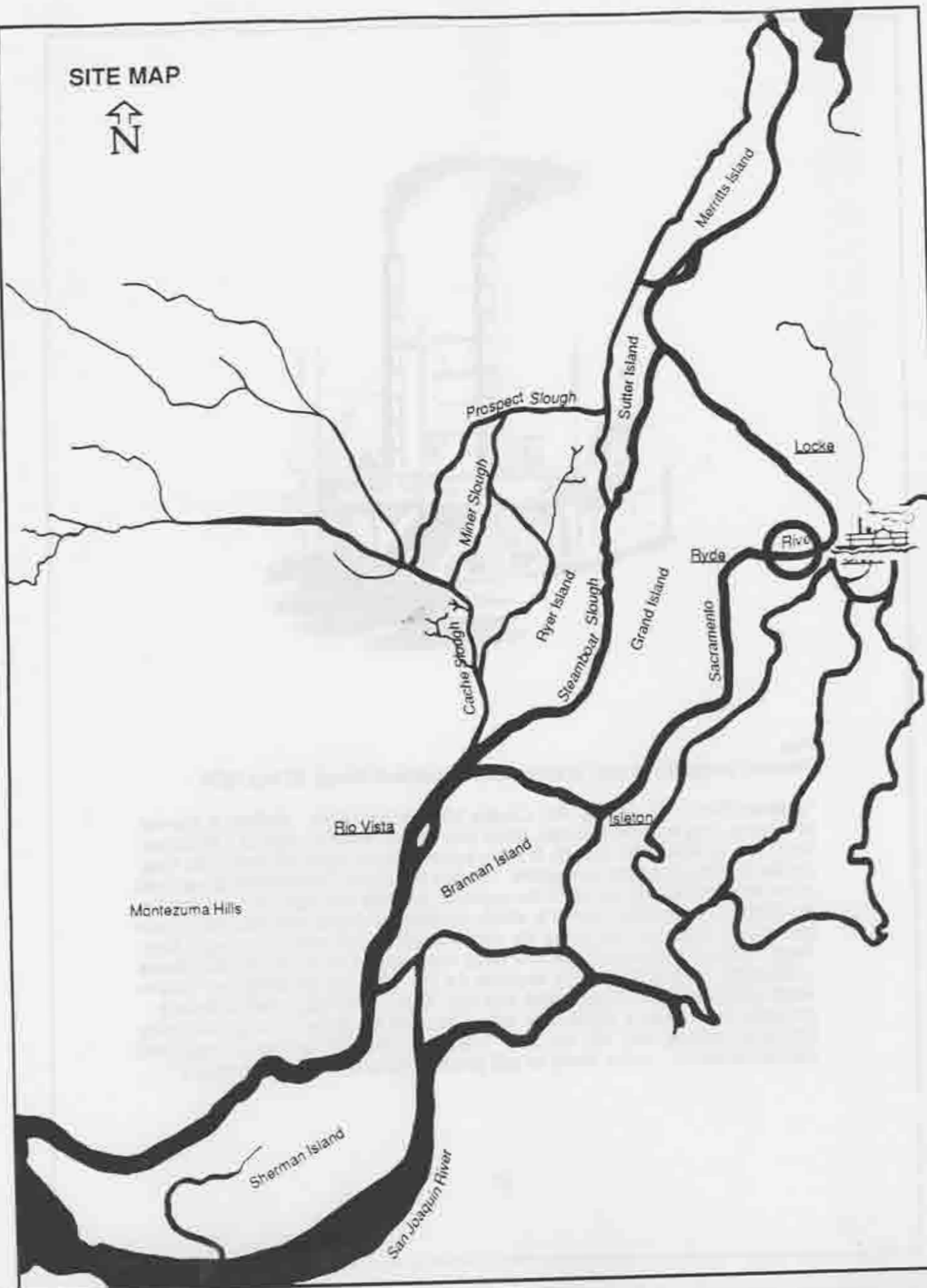


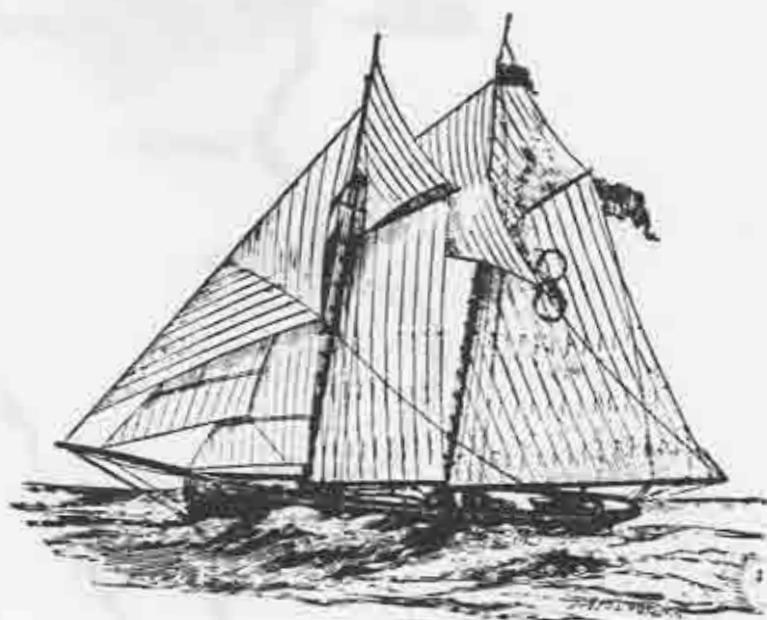
Pet

Steamer, snagged and sunk at a point near Steamboat Slough, 10 Mar. 1870.

"Steamer Sunk.- The steamer *Pet*, Captain McNair, owned by McNair & Brewer, of this city, was snagged and sunk about nine o'clock Monday night at a point near the mouth of Steamboat Slough. It is not known exactly when she struck the snag, the shock not having been perceptible. The first intimation Captain McNair received of the accident was the report of the engineer, the boat was making water rapidly. An examination quickly followed, which satisfied the Captain that the only course left for him to pursue was to run the vessel ashore, which was accordingly done. Soon afterward she sunk, and is now lying with her bow on shore, but the balance submerged. At this time of the accident the *Pet* was in route from Rio Vista to Sacramento towing a barge loaded with hay. Captain McNair came to the city yesterday to procure a barge with which to raise the sunken craft, but being unable to procure one, left for San Francisco, where he will get a barge and steamer, returning to the wreck he will proceed energetically with the raising."

SITE MAP





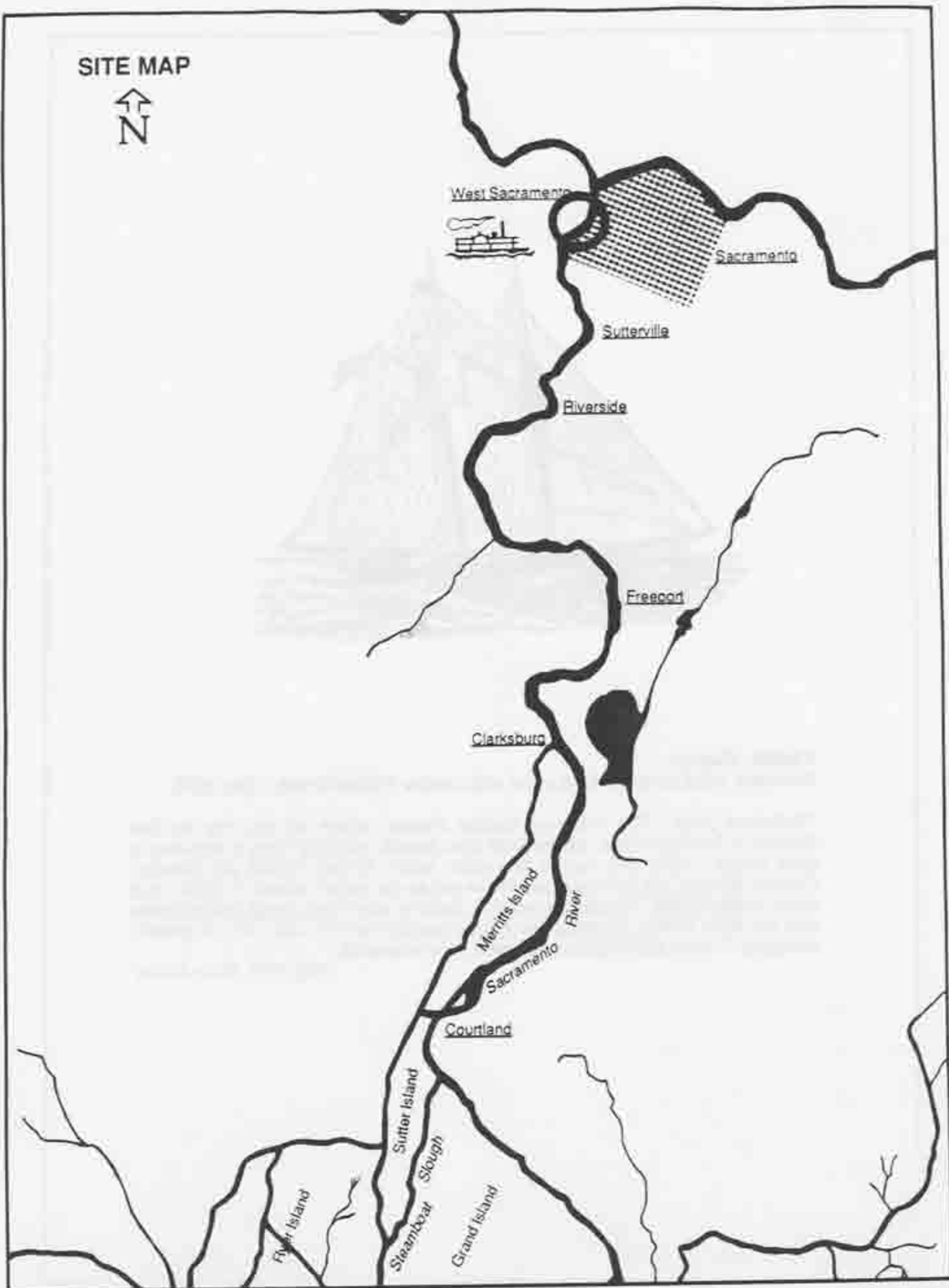
Robbie Hunter

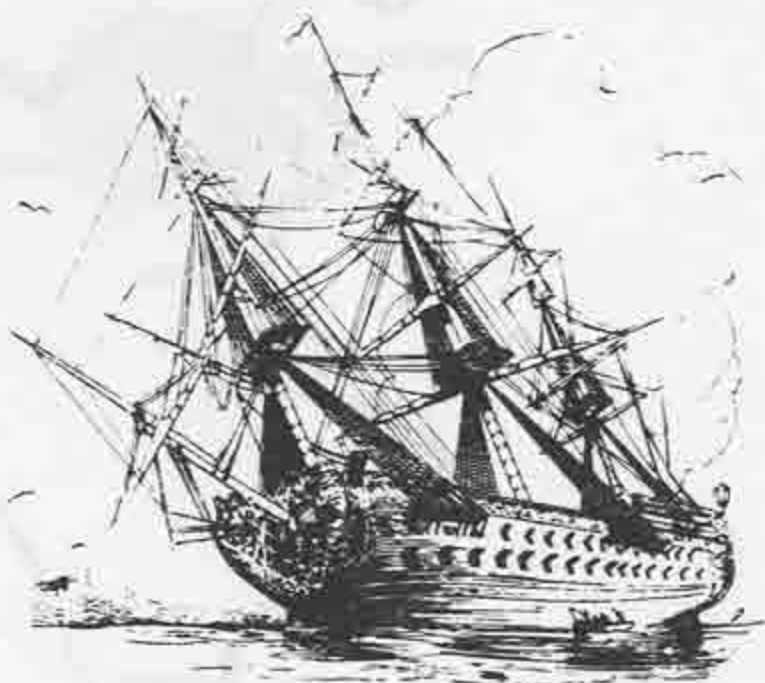
Schooner, stuck snag and sunk a few miles below Walnut Grove. 1 Oct. 1879.

"Schooner Sunk.- The schooner *Robbie Hunter*, which left this city for San Quentin a few days since, loaded with door panels and scrap iron, is reported to have struck a snag and sunk a few miles below Walnut Grove last Sunday. Captain Johnson left for San Francisco to secure the use of vessels to lighten and assist in raising her. Though the water is shallow where she is lying, it is probable that the door panels, forming the greater portion of her load, will be greatly damaged. Vessel and freight are believed to be uninsured."

3/10/1870, Sacto Union

SITE MAP



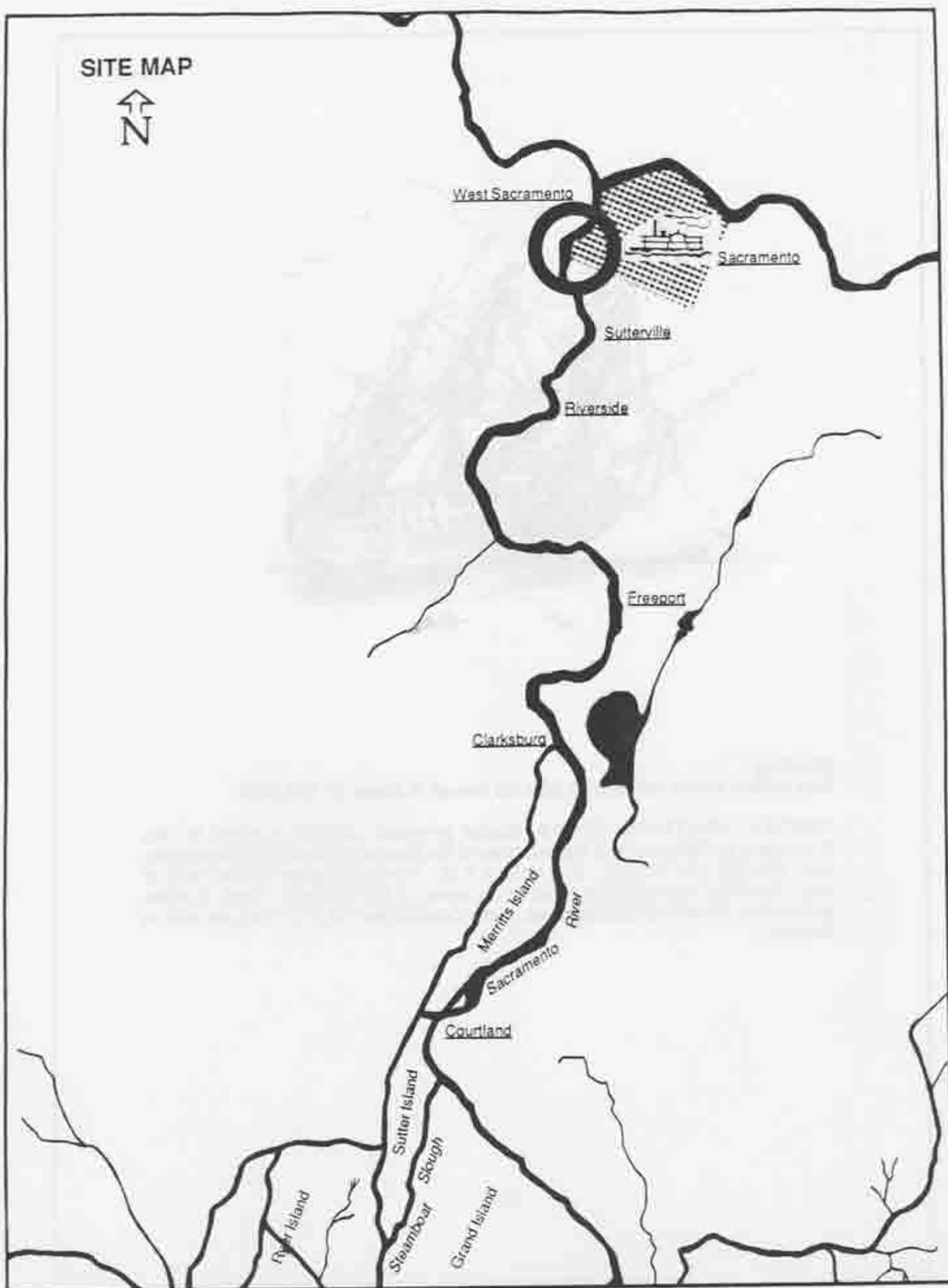


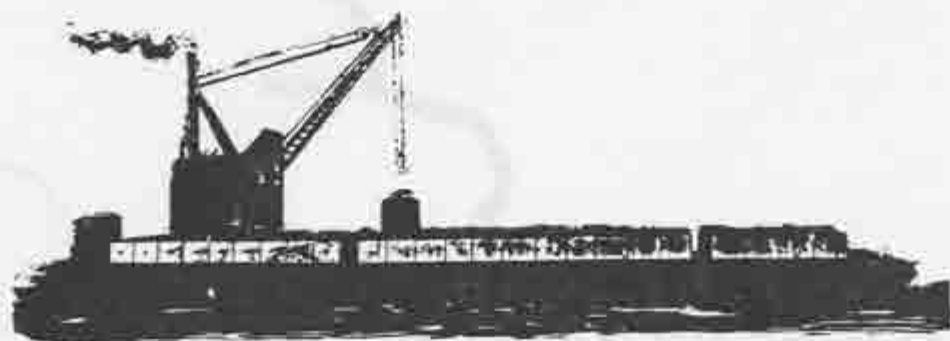
Sterling

Brig sunken hull to be removed from the foot of K Street. 21 Oct. 1854.

"NOTICE TO CONTRACTORS- Sealed proposals will be received by the Committee on Contracts and Expenditures of the Common Council of Sacramento, until Monday, the 23d inst., at 5 o'clock P.M., for removing the sunken hull of brig "*Sterling*," now lying moored to the levee, at the foot of K street, to some point below the city, to be designated by the Council, and not exceeding one mile in distance.

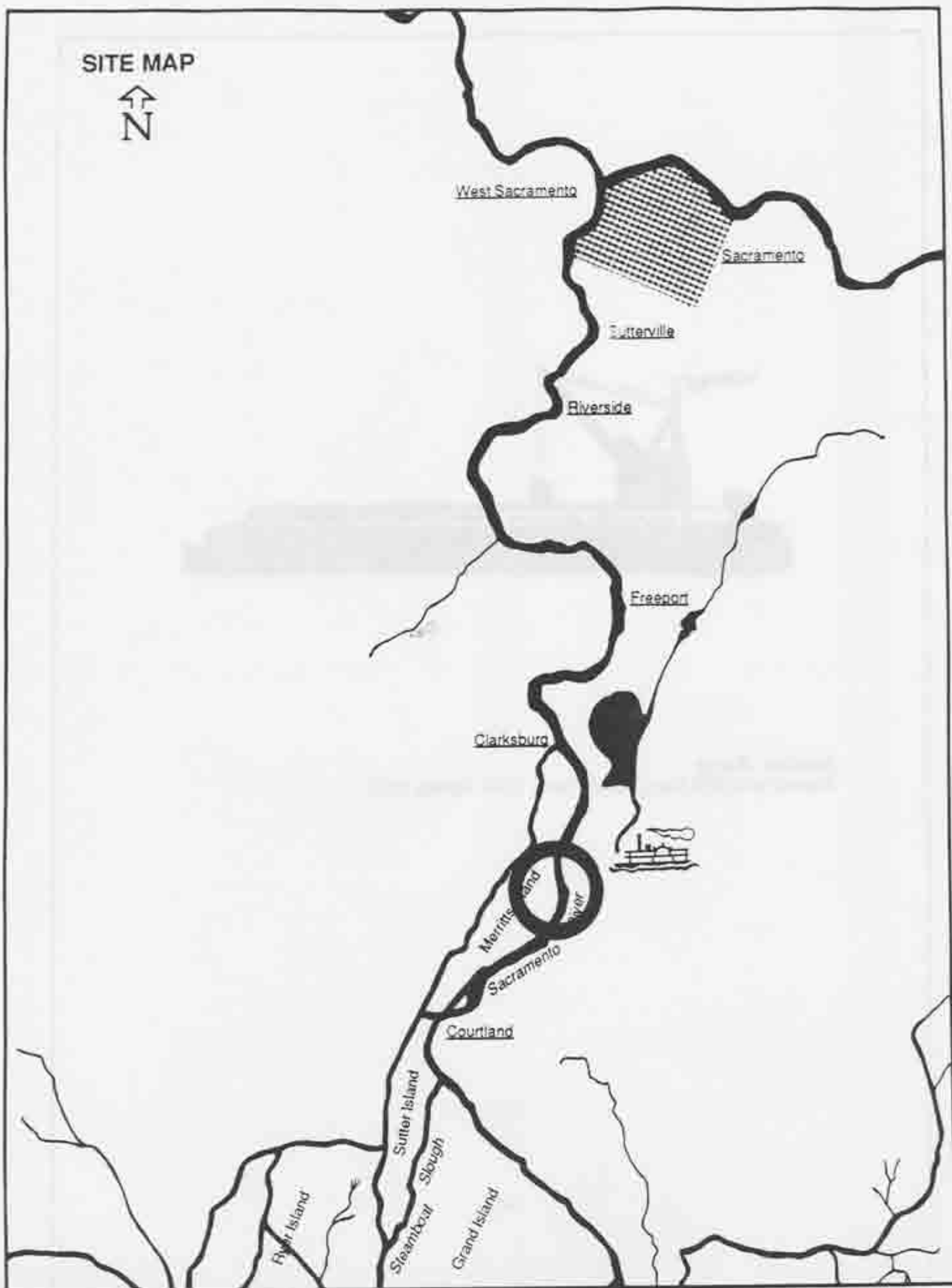
SITE MAP

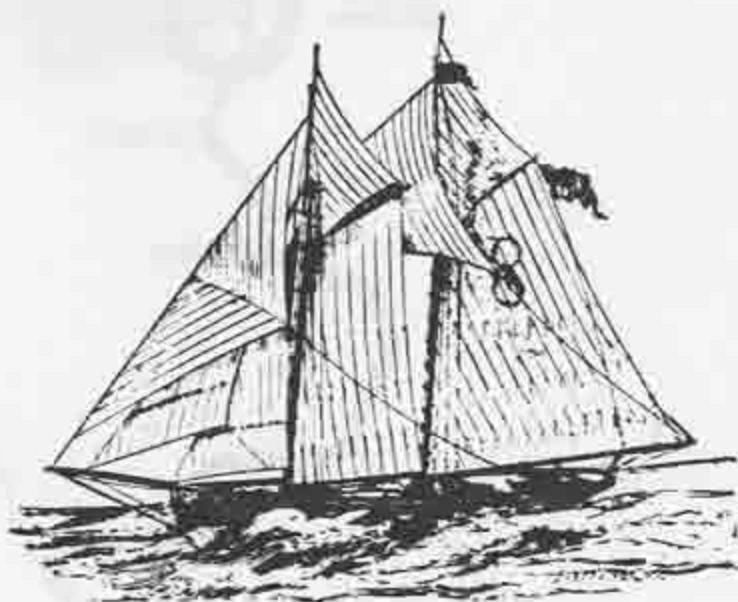




Sunken Barge
Shown on USCE Sacramento River, 1894 Survey Map

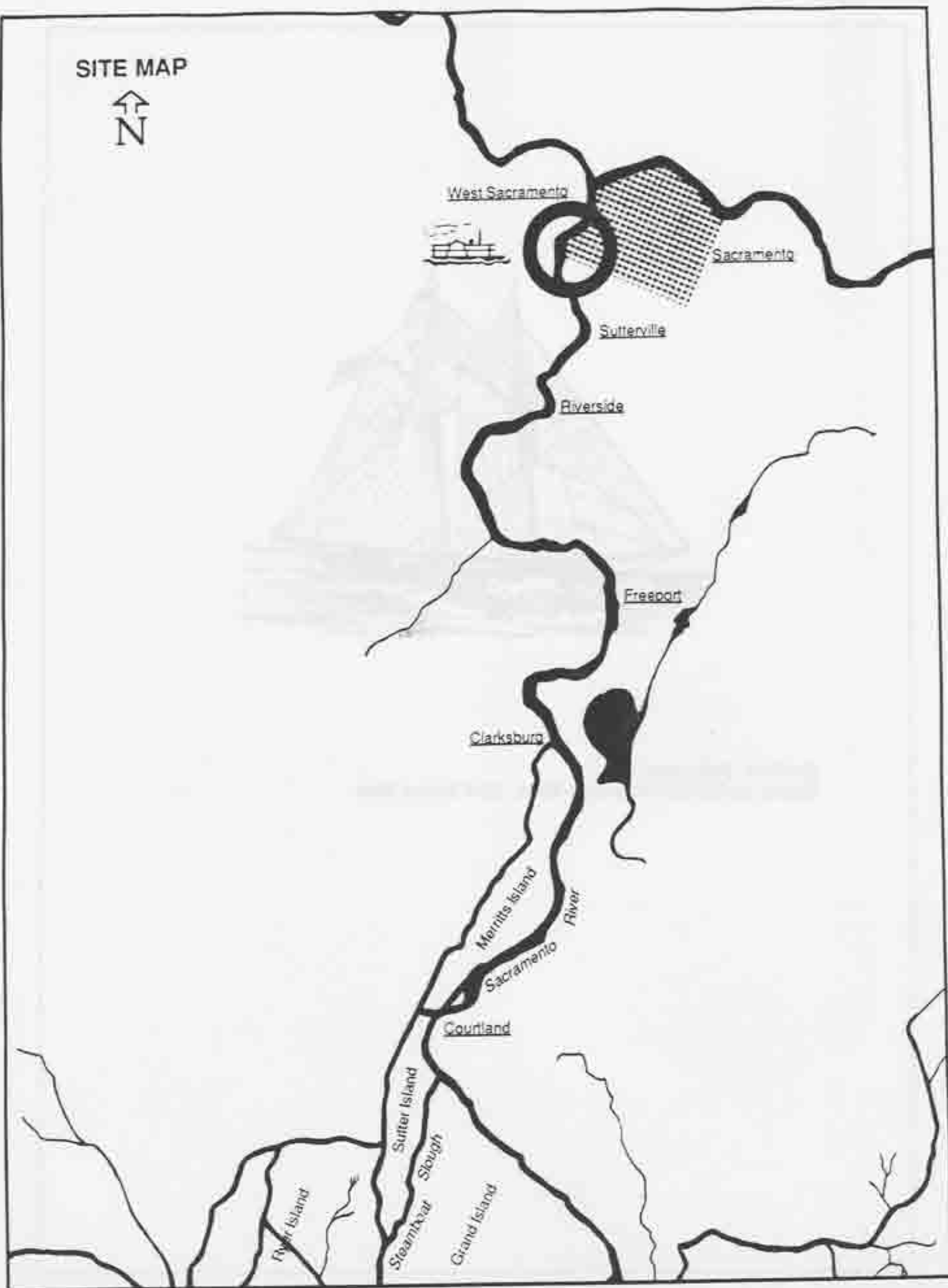
SITE MAP

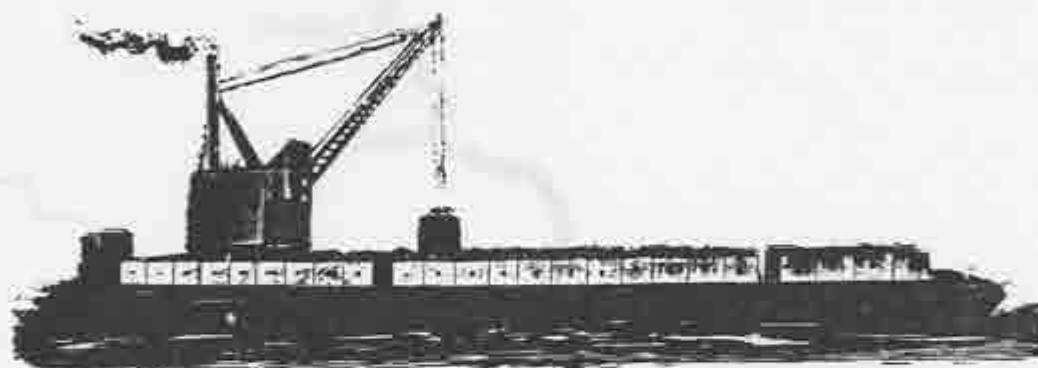




Sunken Schooner
Shown on USCE Sacramento River, 1894 Survey Map

SITE MAP



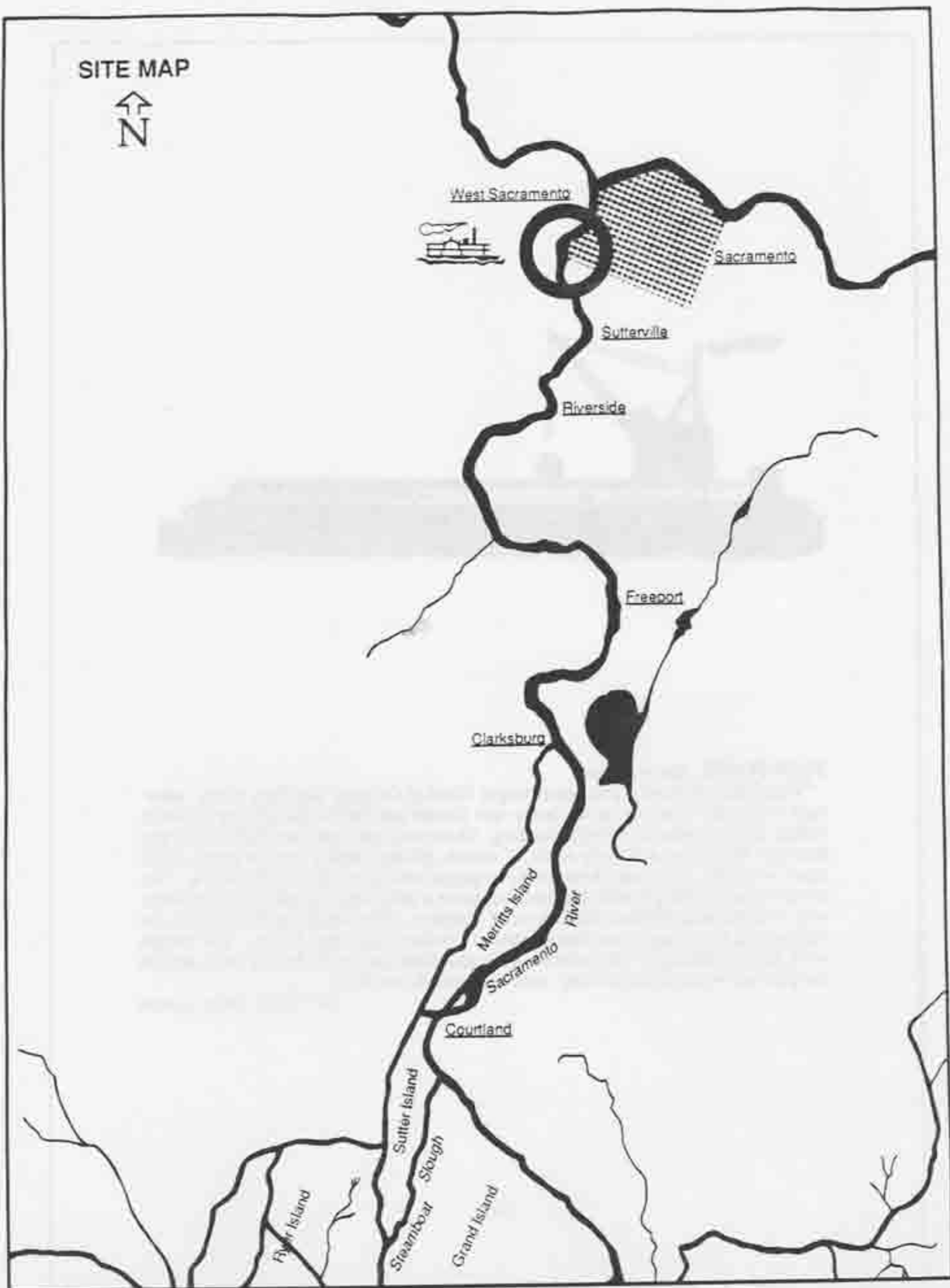


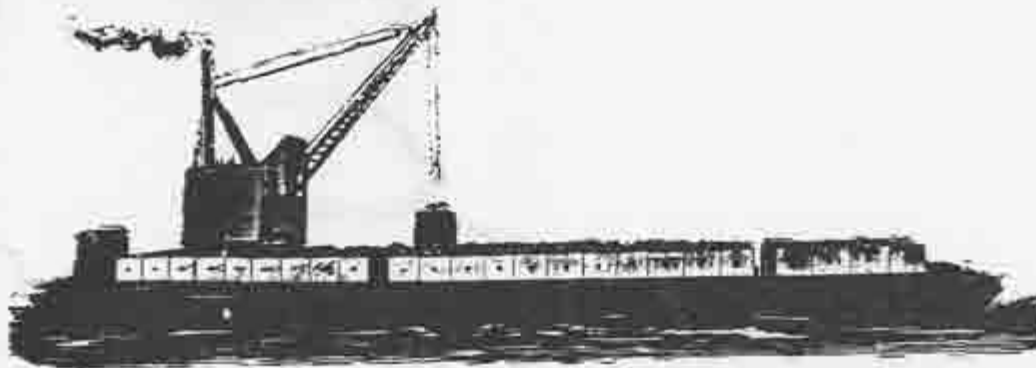
TOM POSSE *Sacto. Union*

"Wood Barges Sunk - The wood barges *Maid of Orleans* and *Tom Posse* were sunk yesterday morning, at the levee--the former just below the Harbor Master's Office, and the latter at Arcego's landing. There was lost from the *Maid of Orleans* between thirty-five and sixty cords of woods, giving employment to many small sized wreckers, who were kept busily engaged raking in stray sticks below. We observed one little girl who had secured quite a pile, waiting anxiously for some one to come and remove them to safer quarters. The wood on the *Tom Posse* (belonging to Arcego) was transferred to another barge and saved. The barges were started leaking by the violence of the gale from the south, driving them against the pier and vessel to which they were respectively moored."

10/1/1879, Sacto. Union

SITE MAP



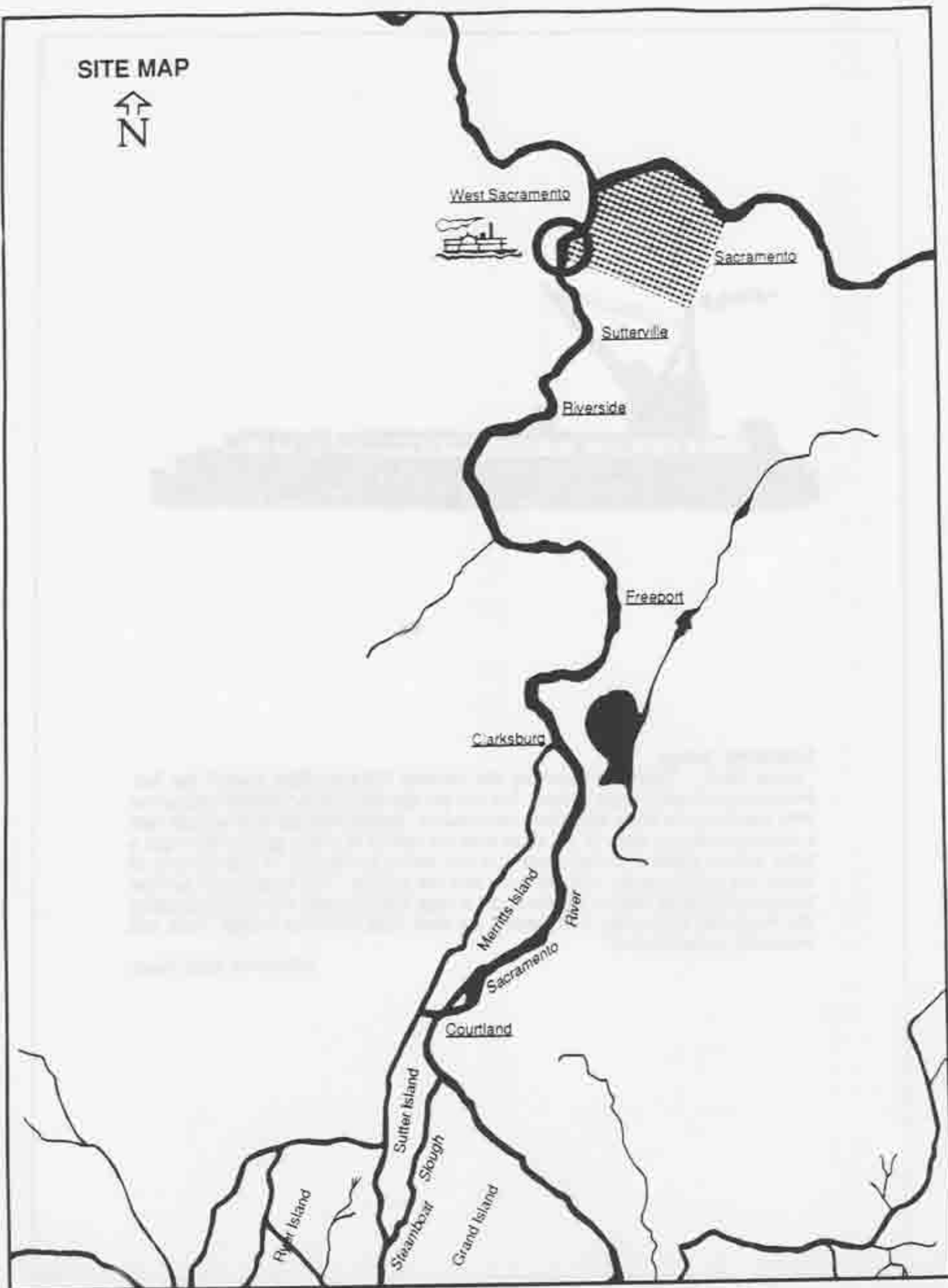


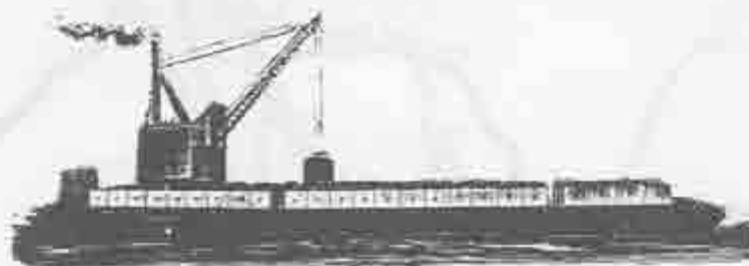
Unknown barge

"Barge Sunk - Yesterday morning the steamer *Chin-de-Wah* started for San Francisco with two barges in tow, but had not got them fairly straightened out on their way from the levee when one, the *Moulton*, loaded with old railroad iron took a sheer and ran too close to the shore near the foot of R street, getting into such a place that her rudder was torn loose and also one or two planks, in consequence of which she quickly sank, with her deck near the surface. The steamer got another barge alongside as soon as possible, and a large force of men was engaged during the remainder of the day transferring the deck load from the sunken craft, and otherwise lightening her."

9/19/1878 Sact. Union

SITE MAP



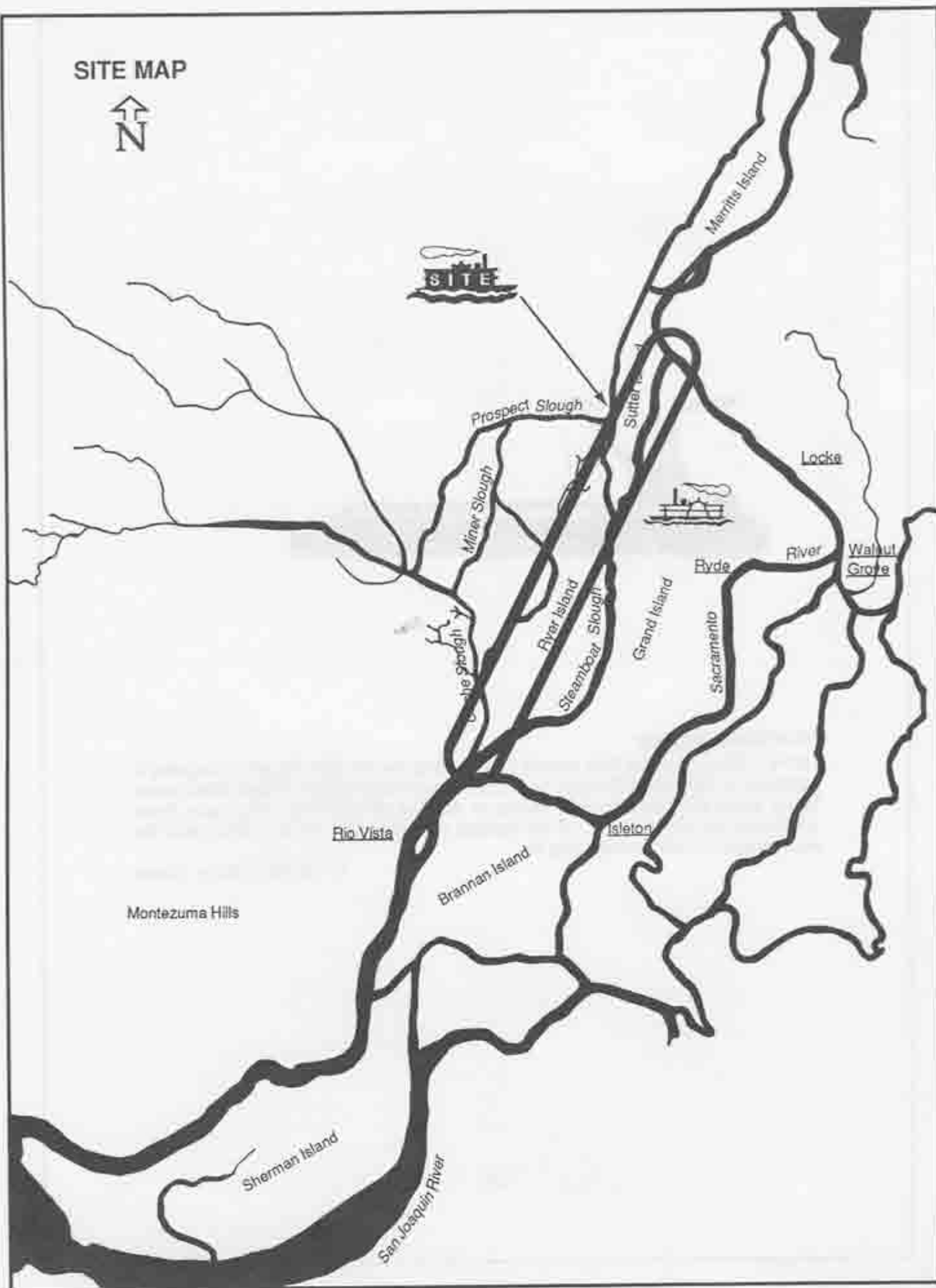


UNKNOWN BARGE

"Sunk - The old barge that served as a landing for the San Joaquin Company's steamers, at the foot of N street, has sunk almost to the bottom. Preparations were being made to raise her, but, owing to the rise of the river, they have been postponed for the present. If the sunken craft gets full of sand there will be considerable trouble in removing her."

11/18/1875, Sacto. Union

SITE MAP





Wasp

Snagged and sunk at Steamboat Slough; cargo : cobbles and bricks. 12 Jan. 1865.

"Sloop Sunk.- We are informed be Captain Streckmire, of the schooner *San Pablo*, that the sloop *Wasp* struck a snag on Thursday night last, in Steamboat Slough, and in a few minutes filled and sunk. She was commanded by Captain Gerke, who, with the crew, succeeded in escaping to shore, although they were unable to free the small boat from the sloop. The *Wasp* was owned by the Captain and C. Clauson, and was valued at \$2400. She was loaded with cobbles and bricks, from Freeport to San Francisco, when the accident occurred."

1/16/1865, Sacto Union

SITE MAP



West Sacramento



Sacramento

Sutterville

Riverside

Freeport

Clarksburg

Merritts Island
Sacramento River

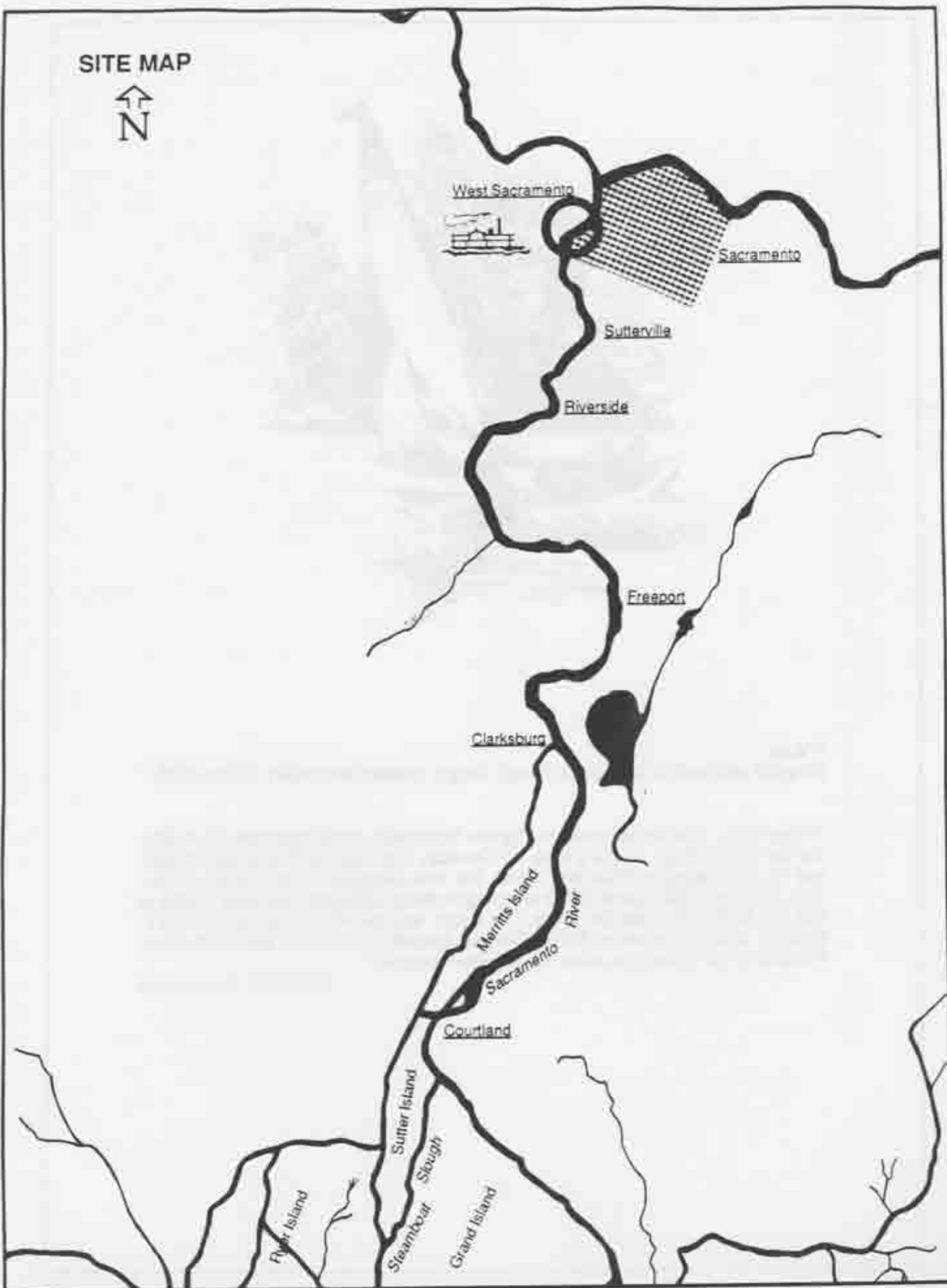
Courtland

Sutter Island

Steamboat Slough

River Island

Grand Island



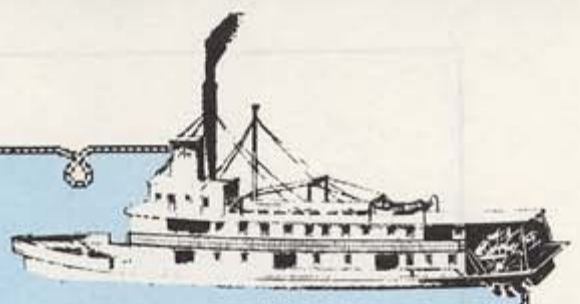


W. H. TAYLOR

Wood barge, wrecked on middle pier of Sacramento bridge. Broken in two pieces.
29 Jan, 1866.

"Wreck of the Wood Barge.- The wood barge *W.H. Taylor* arrived at the bridge at eleven o'clock A.M. yesterday from the upper Sacramento River with about eighty-five cords of wood. For the purpose of passing the bridge with safety the owner made fast to the buoy placed in the river for that purpose. Unfortunately, the line parted, and the force of the current carried her rapidly down stream until she struck broadside against the middle pier of the bridge. After remaining in this position a minute or two, the barge broke in two, about forty feet from the stern. The larger portion, about sixty feet in length, floated down stream, and was recovered and made fast to the foot of R Street. The smaller portion was not recovered, but was carried down river. The wood was nearly all carried off, and was of course a dead loss to the owner. At the time the accident occurred there were six men on board, all of whom saved themselves by climbing up the pier to the bridge. Both barge and cargo belonged to Joseph Anton, a Portuguese. The wood was worth about \$600 and the barge \$800."

1/29/1866, Sacto Union



PRECIOUS CARGO

After minor collisions adjacent to the Embarcadero in Sacramento, all efforts were made to recover the merchandise before it sank.

The following item appeared in the Sacramento Union, showing the exuberant recovery efforts of one especially valuable cargo.

"The Steamer *Cleopatra* came in collision with the steamer *Antelope* about half-past 8 o'clock yesterday morning, in consequences of which the former discharged into the river five one-eighth casks of brandy--the same seemingly rolling of their own motion off the guards of the steamer. Several of the levee boys, having a "taste" for the business, swam out, secured the casks, and returned them after being liberally rewarded for their disinterested exertions."

—*Sacramento Union*, May 24, 1860.





ALPHABETICAL LISTING OF
SHIPWRECKS IN THE SACRAMENTO RIVER
BETWEEN SACRAMENTO AND SHERMAN ISLAND

Alert

Steamship, 65 tons, built 1885, foundered at Rio Vista. 26 Sept. 1919.

Alivso

Steam, side wheel, 197 tons, built 1896, burned at Brytes Bend, Sacramento River. 15 Dec. 1920.

Annie (Hannah) B. Bourne

Schooner snagged at Sutterville. 5 Aug. 1862.

Antelope

Noted for speed, many racing mishaps upon Sacramento River. Steamship 220.6 feet long, brought the first mail from Sacramento to San Francisco from the westbound Pony Express. After collision with *Confidence*, Bushnell the captain put his body into the hole to stem the flow of water until the ship was beached. 1888.

Barge

Barge struck by steamer *Enterprise* about five miles below Nicholas. Sixty tons of freight was lost or destroyed. 9 Nov. 1854.

Barge

Barge began sinking on Sacramento River by the waterworks; it was pulled to shore and salvaged. Deck crew jumped overboard and went downstream. 25 May 1854.

Barge

Sank eight miles above the city. 30 Mar. 1858.

Barge *

Old barge, sunk, it served as a landing for the San Joaquin Company's steamers at the foot of N Street. 11 Nov. 1875.

Belle

Steamship, sidewheel. Exploded and sank at Russian Ford, 11 miles above Sacramento. Captain and thirty people killed. 7 Feb. 1856.



Belle

Sternwheeler, snagged and sunk in fifteen feet of water. Cargo: coal; never raised. 18 Oct. 1870.

***Bessie* ***

Steamer sunk on the Yolo side of the river. December 27, 1869.

***Bianca* ***

Struck a snag; about half the cargo was lost. Sank at the mouth of Cache Creek. 26 Oct. 1854.

Colusa

Sternwheel steamship; built 1911; wrecked near Broderick on September 15, 1932.

***Colusa* ***

Capitol ran into and sank the *Colusa* to eliminate a business competitor. Cargo: Corn and grain. Sank near Collinsville. 19 Oct. 1868.

Commodore

Schooner; rammed by *Yosemite*, 4 miles below Freeport. 17 Mar. 1864.

Continental

Steamship wrecked on the Sacramento. 29 Aug. 1870.

***Cooper's Hulk* ***

Old Prison Brig; Wrecked on Sacramento side of river. 10/1/1879.

Cora

Steamship, hit snag and sank 20 miles below Sacramento on 20 May 1879.

Covina

Gas, screw, 87 tons, built in 1902. Burned at Collinsville. 30 July 1926.

***Crescent* ***

Ship; stripped of salvageable material and abandoned at the foot of Y Street. 21 March 1873.

Daisy

Steamship, sternwheel, sank in the Sacramento River, site unknown. July 17, 1888.

Diamond

Barge, sank in the Sacramento River near Gray's Landing. 10 Sept. 1884.

***Dimon* ***

"Sunk - R street. July 30, 1868.



Eclipse

Barge; wrecked near the bank of Steamboat Slough; efforts to raise were successful--towed to a point near Hog's Back. Probably placed in a position as a wingdam near the mouth of Cache Creek. 1 March 1873.

Edward Everett Jr.

Steamship, wheel, flat bottom. Wrecked in the Sacramento River after third trip. Engine sold to miners and the hull sold for ferry. 1849.

***Eliza* ***

Barge; Sunk. 3 December 1864.

***Fanny Ann* ***

Propeller, sunked while destined for Cache Creek with cargo of grain. 9 November 1868.

Fawn

Steamship, exploded near Sacramento; two dead. 18 August 1851.

Flora

Steamship, sternwheel, 185 tons, built 1885; burned at Broderick with other ships. 30 September 1932.

***F. W. Grawford* ***

Sloop - snagged, lies in 16 feet of water below headreach of Steamboat Slough; cargo: Brick. July 30, 1868.

***General Redington* ***

Steamer; collision with pier opposite carpenter's bridge in Sacramento. 7 November 1859.

George Washington

Sank at Sacramento. 5 November 1849.

Goliath

Schooner; lost when foundered at Cache Slough during a Benicia/Courtland run. 22 July 1879.

Grace Barton

Sternwheel, burned at Rio Vista during the filming of "Jim Bluso," a movie. Camera man took advantage of good shots and filmed it. 1916.

Gypsy

Steamer; snagged 20 miles below Sacramento near Lufkin's Ranch. 2 September 1862.



Hector

Barge; struck a snag above Bogg's Ranch on upper Sacramento.
12 February 1873.

Hoosier

Sacramento River. 1853.

***Helen Hensley* ***

Steamship; towed to the back of Wood Island and abandoned. Boilers, engines, everything else of value was removed. 12 March 1873.

Isleton

Burned to water's edge in Sacramento River. Cargo saved.
2 July 1909.

J.A. McClennan

Steamboat; blew up near Knight's Landing. Killed twenty five people.
Pilot blown 200 feet into the air. 25 August 1861.

Jacinto

Steamship, sternwheel, 235 tons, built 1889. Wrecked at Broderick.
30 September 1932.

Jack Haynes

Steamboat; snagged while sailing the Sacramento River (Re-named
the *R. K. Page*). February 1851.

James Rolph

Sailship, 228 feet, built 1884 at Liverpool. Burned at Shermans's Island.
Burned at the same location as the *ANNIE ROLF*, but four days later. Same
owner. 27 December 1938.

***Kate Blackstone (Blakinston)* ***

Schooner; capsized at the foot of Y Street, Sacramento, within 100 feet of
the east bank. 15 June 1865.

***La Grange* ***

Bark; old Prison Brig. 24 December 1859.

Launch

Sank on the Sacramento River. Loaded with merchandise. Two
people drowned, three other safely reached shore. 9 May 1849.

Linnea

Gas, screw, 51 tons, built 1908. Burned at Sacramento. 27 Sept. 1927.



Lizzie Patterson

Barge, sank in Sacramento River. Cargo: grain. 4 August 1879.

Lizzie Theresa

Gas, screw, built in 1876. Burned in Suisun Bay. 10 July 1920.

Long Island *

Schooner; collision with submerged *Ninus*. 23 February 1860.

Major Tompkins

Swedish ship. Exploded in the Sacramento River; killed two people. 23 January 1851.

Mariposa

Rammed and sunk by *WEST POINT*, at New York of the Pacific (Pittsburg); later raised. 28 October 1850.

Melvina

Wrecked somewhere. Gas, screw, 63 tons. 10 October 1920.

Miner

Sternwheeler, 75 tons. Built 1850. Burned to water's edge at New York of the Pacific. 9 October 1851.

Missouri

Snagged and a total loss, in the Sacramento River. February 1851.

Monitor *

Barge; burnt and sunk two miles below Rio Vista. 25 July 1864.

Mosquito

Barge; Snagged; rested below the Sacramento and Yolo bridge. Cargo was wood. 29 July 1864.

Natalie

wrecked at the foot of N street, demolition of salvagable materials. March 1856.

Neponset #2

Sternwheeler, 224 tons, built 1884; foundered in Georgiana Slough, Sacramento River.

Nevada *

Cache Slough; mired in quicksand. Remains there today. Racing with the *New World*. 1863.



New World

Steamship. Exploded near Sacramento; 15 injured, 2 dead. 3 May 1851.

New World

Steamship, snagged and sunk 9 miles below Sacramento on the Yolo side of the Sacramento River. 10 October 1854.

***Ninus* ***

Bark, in the river below R Street. 16 November 1861.

O. K.

Small steamer burned on the Yolo side opposite M Street. 3 July 1865.

***Old Hulk* ***

Snagged at Nevada's Landing

Pearl

Steamship, side-wheeler. Boiler exploded at mouth of American River; 54 killed. Ship was raised. 27 Jan. 1855.

Pet

Steamer, snagged and sunk at a point near Steamboat Slough. 10 Mar. 1870.

***Pike* ***

Wood barge; snagged "below" bridge in Sacramento. 29 June 1864.
Cargo: Wood.

Pioneer #1

Sacramento River. 1849.

Pioneer

Steamship, sunk Sacramento River, cargo saved. 1872.

Plumas

Sacramento River. 1854.

Port Saunders

Steamship, 112 tons; built 1920. Burned in the Sacramento River.
September 2, 1941.

R.K. Page

Formally *Jack Hayes*. Enroute, Sacramento/Marysville. Racing with the *Governor Dana*. Used pitch, tar and oil for extra speed. blew up. Common practice at the time to obtain more speed; 24 killed. 22 February 1853.



Robbie Hunter *

Schooner, stuck snag and sunk a few miles below Walnut Grove.
Destination was San Quentin. 1 October 1879.

Sacramento

Sternwheeler, built 1914, burned at Broderick. 16 September 1932.

Salinas

Sloop; collided with steamer *New World*. 5 January 1876.

San Joaquin #2

Built in 1875, 242 tons, burned at Broderick. 30 September 1932.

San Joaquin #3

Built in 1877, side-wheeler. Burned at Sacramento. 25 September 1910.

San Joaquin #4

Steamship, sternwheeler, 365 tons, built 1885. Most powerful river steamer at the time. Burned at Broderick. 30 September 1932.

San Jose

Sternwheeler, 192 tons, built 1889. Burned at Broderick.
30 September 1932.

San Pablo

Schooner; struck a snag near Sutterville. 11 August 1862.

Shasta

Cargo: bales of hay. Owned by Mrs. Carl Juhl, only woman shipowner on the Pacific Coast. 30 September 1926.

S.M. Whipple

Sunk in Suisun Bay. 11 November 1875.

S.N. Bentley

Steamer; struck a snag 40 miles below Sacramento.

Sophie McClean

Sternwheeler, built 1858. Exploded at Suisun Bay wharf, 13 dead and missing. Boiler made from the same batch of steel as the *Washoe*, which also blew up. 26 November 1864.

Star Of The West

Wood barge; struck the western pier of the Sacramento and Yolo bridge and capized 8 August 1962.



Sterling *

Brig sunken hull to be removed from the foot of K Street.
21 October 1854.

Sunken Barge

Shown on USCE Sacramento River, 1894 Survey Map

Sunken Schooner

Shown on USCE Sacramento River, 1894 Survey Map

Tom Posse *

Barge; Sunk at Arcego's landing. Cargo was wood. October 1879.

Underwriter

Sunk in the Sacramento somewhere. 1857.

Unidentified barge

Barge at the foot of N street. 18 November 1875.

Unidentified barge

"Barge Sunk. 19 September 1878.

Unidentified Launch *

Launch sunk about forty miles above Suisun, in the Sacramento river.
9 May 1849.

Valletta

Sternwheeler, river steamer, built in 1901; burned at Broderick.
3 September 1932.

Visalia

Steamer; sank at Hayes Bend, three miles above Nicholas; snagged.
25 May 1864.

Victor

Snagged and sank at Pike's Cut-off, near Coloma. March 1868.

Villa

Capsized in Suisun Bay; cargo : railroad steel. 24 January 1869.

Warrens Cutter

Cutter sailed for Fort Sacramento with payroll for garrison. Last sighted passing through Suisun Bay. Never reached Fort Sacramento. Ship was commanded by the sons of the Commodore of the Pacific Squadron, Montgomery. Loss, three officers, nine seamen December 1846.



Washoe

Blew up thirty five miles down from Sacramento. Killed 85 people.
5 September 1864.

***Wasp* ***

Sloop; Snagged and sunk at Steamboat Slough; cargo: cobbles and bricks.
12 January 1865.

Weithpec

Sidewheeler, built 1904, burned at Brytes Bend, Sacramento River.
15 December 1920.

***W. H. Taylor* ***

Wood barge, wrecked on middle pier of Sacramento bridge. Broken in two
pieces. 29 January 1866.

Wilhelmina

Gas, screw, 112 tons built 1918. Burned at Fourteen Mile Slough,
Sacramento River. Carried lumber and a general cargo. 16 December 1935.

Yosemite

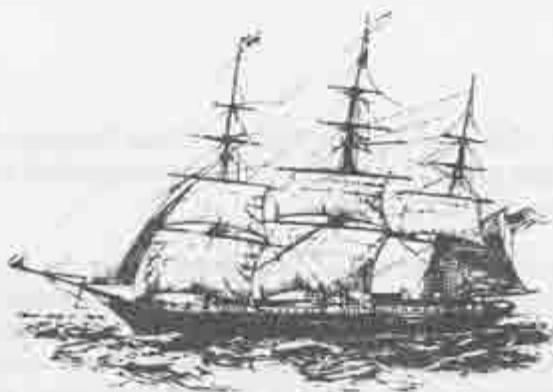
Steamship, 1319 tons, blew up at the wharf at Rio Vista. Killed 29 Chinese
in the China Hold. Killed twenty-two others and injured 50. Ship was
raised. Finally sunk in Puget Sound, 12 October 1865.

Yuba

Snagged in the Sacramento River; total loss. February 1851.

Zinfandel

Steamship, 329 tons. Built 1889. Foundered at Miner Slough, Sacramento
River. 5 September 1922.



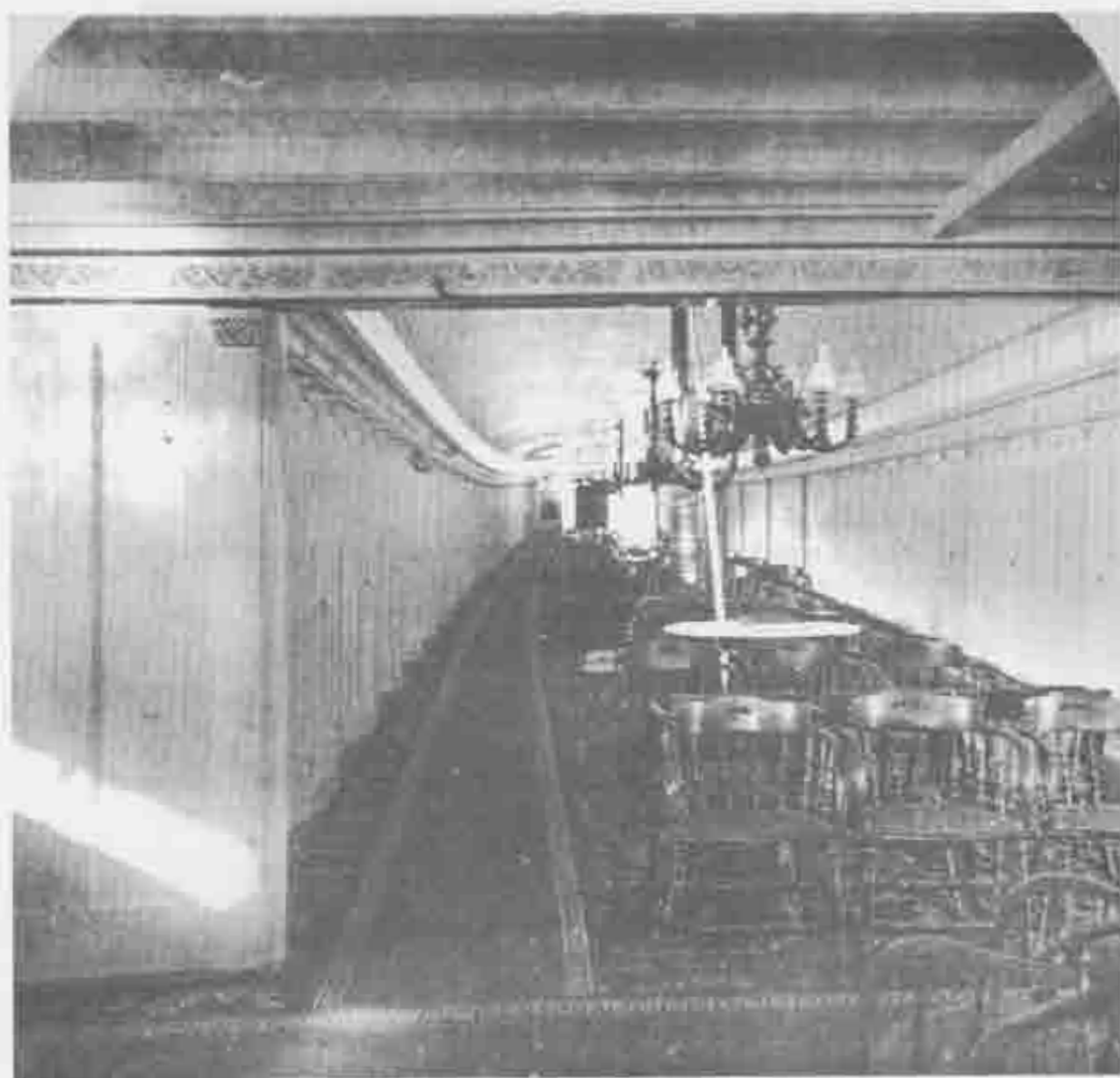


Figure 14. Cabin of the Sacramento River Steamer Capital. This picture helps provide meaning to the term applied to some of the riverboats — Floating Palaces.

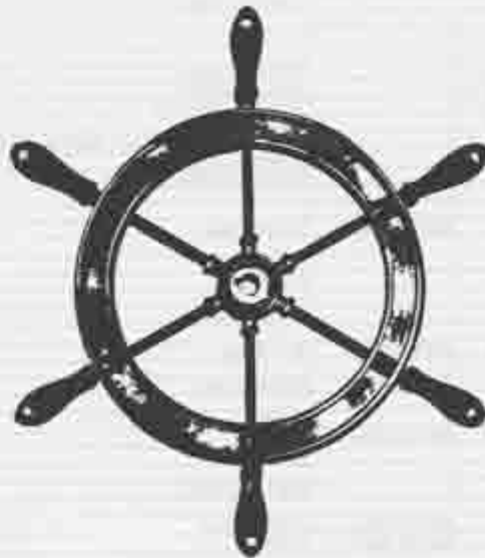
The doors to the individual cabins are along the left side of the picture. These doors opened out onto the common lounge area. Although the cabins were furnished nicely, they were quite small, by modern standards, and without much cross-ventilation. As a result, passengers spent much of their waking hours in the lounges.

CULTURAL DEVELOPMENT LIST

The following list was abstracted from early charts and maps. Each map was researched from the project limits near Rio Vista northerly to Sacramento. This list contains map title, source of map, date, scale, county, general location, formal name, and cultural features shown on the map. These maps are listed chronologically and are indicative of cultural growth along the Sacramento River.

The early 1841 sailing chart shows Suttersville as the only cultural feature on the chart. The 1894-5 Corps of Engineers Map are at a scale of 1"=300' which shows in detail the many farms, landings and docks along the Sacramento River system, including two sunken vessels.

Staff studied each map carefully to catalog information that would suggest archaeologically significant sites.



Map Title	Source	Date	Scale	County	General Location	Name	Features Shown on Map
West. Sailing Chart		1881	None	Sacramento		Sutters River Narrows	town
West. Sailing Chart	USCGS	1890	None	Solano		Montezuma House	house
West. Sailing Chart	USCGS	1890	None	Solano		Suzann City, Rio Vista (Town)	town
West. Sailing Chart	USCGS	1890	None	Sacramento	Taylor/Grand Is.	Barber Sr.	house
West. Sailing Chart	USCGS	1890	None	Sacramento		A. Ransom & Sons	house
West. Sailing Chart	USCGS	1890	None	Sacramento		Indian Village	village
West. Sailing Chart	USCGS	1890	None	Sacramento		Indian Village	village
West. Sailing Chart	USCGS	1890	None	Sacramento		Barber Jr.	house
West. Sailing Chart	USCGS	1890	None	Sacramento		Webster or Russian Embassadors	house
West. Sailing Chart	USCGS	1890	None	Sacramento		Sutterville (Town)	town
West. Sailing Chart	USCGS	1890	None	Sacramento		Sacramento (Town)	city
West. Sailing Chart	USCGS	1890	None	Yuba		Washington (Town)	town
West. Sailing Chart	USCGS	1890	None	Sacramento		Georgetown (Town)	town
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Walrus Grove (Town)	wharves
USCGE Sacto. River	USCGE	1894	1"=300'		Tyler Island	Green's Landing	landing
							wharves
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Egg Wharf	wharf
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Travis Landing	landing
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento	Grand Island	Paxon Ranch	warehouse
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento	Grand Island	H.D. Karchner	wharf
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Van Lozen Sigs, Upper Landing	landing
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento			wharf
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Levi Parkers Cannery	cannery
							wharves
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Courtland (Town)	blacksmith
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento			wharves
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Orinogen (Town)	butcher
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento			wharf
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Oborn	20 or so houses
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Green's	wharf
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento			dry house
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Skiff Landing	wharf
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Launch House	landing
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Hoffman Landing	house
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento			landing
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Richard (Town) Gamblers Warehouse	warehouse
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Oborn Landing	warehouse
							landing
USCGE Sacto. River	USCGE	1894	1"=300'	Yuba		Clatsburg (Town)	store
							wharf
							blacksmith
							store
							house
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Shoshman Landing	landing
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Eagle Point Landing	landing
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Sacramento Ship Yn	brick kiln
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Freight (Town)	
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Truckyard of the Sacramento Transportation Co.	wharf
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Sutterville (Town)	
USCGE Sacto. River	USCGE	1894	1"=300'	Sacramento		Sacramento (City)	Sutterville (City)
USCGE Sacto. River	USCGE	1895	1"=300'	Solano	Long Tree Island	C. Larnen House	house
							bridge
							dam
USCGE Sacto. River	USCGE	1895	1"=300'	Solano		R. D. Robbins	house
USCGE Sacto. River	USCGE	1895	1"=300'	Solano			pool
USCGE Sacto. River	USCGE	1895	1"=300'	Sacramento	Sherman Island	Yolande (Town)	wharf
USCGE Sacto. River	USCGE	1895	1"=300'	Sacramento	Sherman Island	W. A. Huston	warehouse
USCGE Sacto. River	USCGE	1895	1"=300'	Sacramento	Sherman Island	Emmerson (Town)	house
USCGE Sacto. River	USCGE	1895	1"=300'	Sacramento	Sherman Island		dam
USCGE Sacto. River	USCGE	1895	1"=300'	Solano		Gleason	warehouse
USCGE Sacto. River	USCGE	1895	1"=300'	Solano	Brannen Island	Wicks	wharves
USCGE Sacto. River	USCGE	1895	1"=300'	Solano		Rio Vista (Town)	wharves
USCGE Sacto. River	USCGE	1895	1"=300'	Solano			warehouse
USCGE Sacto. River	USCGE	1895	1"=300'	Solano		New Town (Town)	wharves
USCGE Sacto. River	USCGE	1895	1"=300'	Sacramento	Brannen Island	Thomas McCourt	warehouse
USCGE Sacto. River	USCGE	1895	1"=300'	Sacramento	Brannen Island	Hunnis	landing

USCE Sects. River	USCE	1889	1" x 300	Sacramento	Brannan Island	Ferry Landing (Steamboat Squads)	landing
USCE Sects. River	USCE	1889	1" x 300	Sacramento	Brannan Island	S. Dam Landing	landing
USCE Sects. River	USCE	1889	1" x 300	Sacramento	Brannan Island	Torchburn's	wharf
							and
							grills
USCE Sects. River	USCE	1889	1" x 300	Sacramento	Andrus Island	Isleton (Town)	Chase Town
							entrance
Chart Sects. River	Purnett Bros.	1892	1" x mile	Solano		Marquette Landing	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Solano		Robert	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Shaman Island	Landing	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Solano		Farley	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Solano		Tolando (Town)	town
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Shaman Island	Sassara	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Shaman Island	Emmerson (Town)	town
Chart Sects. River	Purnett Bros.	1892	1" x mile	Solano		R. Hansen	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Solano		Peterson	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Shaman Island	Utaham	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Solano		Neal	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Solano		Cooms	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Brannan Island	Zelle	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Brannan Island	Kulpeck	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Brannan Island	J. F. Weiss	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Solano		Rob. Vieta (Town)	town
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Brannan Island	Roper	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento		New Town (Town)	town
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	McIntyre	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Brannan Island	J. Rose	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Brannan Island	McCoy	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	Turner	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Brannan Island	Hedden	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Brannan Island	C. F. Tenbury	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	Baxter	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Brannan Island	H. F. Smith	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Brannan Island	Isleton (Town)	town
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	Starna	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	Mrs. Budds	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	McCarty	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	Wilcox	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	Turners	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	Johnson & Lund	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	A. Hanson	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	C. K. Gals	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	John Smith	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	Pedre	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	T. W. Sheehan	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	J. Aldrich	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	C. C. Perkins	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	Mrs. Henesey	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	J. Kennedy	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	G. A. Knox	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	C. Whetstone	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	O. Leary	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	Mrs. Smith	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	Ben Chambers	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	C. Benin	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	D. Leary	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	Mrs. Thelby	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	Forster	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	Conroy	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	H. Thelby	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	Rode (Town)	town
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	F. Peters	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	J. Albert	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	F. Crow	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Andrus Island	E. Darrin	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	C. Hansen	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	W. Madala	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	H. Madala	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento		Walnut Grove (Town)	town
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	Cannery Landing	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	J. L. Kerthens	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento		J. Wale	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento	Grand Island	A. J. Reynolds	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento		Lock & L.	landing
Chart Sects. River	Purnett Bros.	1892	1" x mile	Sacramento		A. J. Oakley	landing

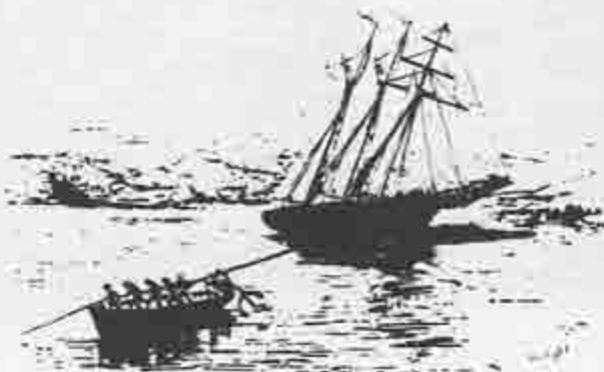
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Eastman	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Grand Island	Covent	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Green	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Von Loebenstein lower	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Grand Island	H. Karchevia	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		E. Tarnes	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		J. Crofton lower	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Grand Island	Ford lower	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		J. Crofton upper	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Grand Island	Grand Island wharf	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Grand Island	Crofton	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Grand Island	J. G. Hall	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Grand Island	E. P. Rice	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Vandert	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		J. R. Chase	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Grand Island	E. R. Faxon	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		C. V. Tarnes	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Grand Island	Mrs. Cogswell	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		S. Runyon	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Kanady	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Grand Island	H. P. Karchevia	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		W. H. Berry	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Orin Bridge	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Lorenson Upper	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Grand Island	Mrs. K. Karchevia	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Chase	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Sutter Island	C. H. Bates	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		O. R. Runyon	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Vandert	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Sutter Island	A. J. Fick	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Sutter Island	Orin	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Wedley	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Sutter Island	Meeks	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Painted Hills	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		G. A. Smith	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Condon	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		B. Bates	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Courtland (Tower)	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	N. Bump	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Smith	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	Farran	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Rancho Island	G. Osborne	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	W. F. Gammon	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Rancho Island	J. W. Den	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento	Rancho Island	G. B. Green	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	J. L. McFadden	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		O. Horkstet	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	H. Ryman	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		S. W. Ralston	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Mrs. Payne	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	Green Brothers	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Richard (Tower)	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	C. Nelson	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	A. J. Bode	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		G. D. Gertman	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Dr. Williams	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	B. T. King	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		W. Johnson	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		M. S. Green	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	S. Smith	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Bryant	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	Geo. Conner	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Osborn	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo	Marysville Island	L. Winter	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Warners	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo		Carlsburg (Tower)	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo		Webster	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Scottham	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo		Hammond	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo		Peters	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo		Crump	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo		Pump	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo		Cave	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Yolo		Brown	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Eagle Point	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Gouley	ending
Chert Sacto River	Purnett Bros	1912 11 miles	Sacramento		Mrs. Moore	ending

Chart Sacto River	Purnett Bros	191211	amile	Yolo		Boys &	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Miller	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Beech Grove	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Brickyard	ending
Chart Sacto River	Purnett Bros	191211	amile	Yolo		Hop House	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Wine House	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Roseport (Town)	town
Chart Sacto River	Purnett Bros	191211	amile	Yolo		T. Soto	ending
Chart Sacto River	Purnett Bros	191211	amile	Yolo		Hop House	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Ruthers	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Williams Ferry	ending
Chart Sacto River	Purnett Bros	191211	amile	Yolo		Sheep Ranch	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Haycocks	ending
Chart Sacto River	Purnett Bros	191211	amile	Yolo		Grades	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		McGee Pump House	ending
Chart Sacto River	Purnett Bros	191211	amile	Yolo		Pasadena Ranch	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Libson Ranch	ending
Chart Sacto River	Purnett Bros	191211	amile	Yolo		St. Ranch	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Whiskey	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Ox Road	ending
Chart Sacto River	Purnett Bros	191211	amile	Yolo		Frank Martin	ending
Chart Sacto River	Purnett Bros	191211	amile	Yolo		Big Barn	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Brickyard	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Pertan	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Riverside (Town)	town
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Lufkin	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Spokane Brook	ending
Chart Sacto River	Purnett Bros	191211	amile	Yolo		Chocoma	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Sutterville	town
Chart Sacto River	Purnett Bros	191211	amile	Yolo		McGowan	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Washington	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Loudale	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Markey	ending
Chart Sacto River	Purnett Bros	191211	amile	Yolo		Conrad	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento		Sacramento (City)	city
Chart Sacto River	Purnett Bros	191211	amile	Yolo		Washington (Town)	town
STEAMBOAT SLOUGH - SECTION OF MAP							
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	Nazi	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Ross	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Smith	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	Mathews	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	Chris Ranch	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Castle	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	Walters	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Hollenbeck	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	C. A. Wiley Ferry	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Thompson	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	O. Baker	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Nord	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	Parfitts	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Boght	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	Jones & Seimaur	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	Godman	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	L. W. Myers	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	F. Myers	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	H. W. Myers	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	J. Collins	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Sutter Island	Huxley	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Sutter Island	Sullivan	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	F. Davis	ending
Chart Sacto River	Purnett Bros	191211	amile	Sacramento	Grand Island	A. W. Stuart	ending
WATER SLOUGH - SECTION OF MAP							
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Tutman	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Tutman	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Powell	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Warner	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Thomas	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Cady	ending
Chart Sacto River	Purnett Bros	191211	amile	Soano	River Island	Thomas	ending
Air Comp	1:5000	USCAGS	192111	10000	Soano	Toranda Landing (Town)	ending
Air Comp	1:5000	USCAGS	192111	10000	Sacramento	Sherman Island	Small boat idg
Air Comp	1:5000	USCAGS	192111	10000	Sacramento	Sherman Island	Emmston (Town)
Air Comp	1:5000	USCAGS	192111	10000	Sacramento	Sherman Island	Pign. Wharf
Air Comp	1:5000	USCAGS	192111	10000	Sacramento	Sherman Island	Small boat landing
Air Comp	1:5000	USCAGS	192111	10000	Soano	Decker Island	Canner Landing

Air Camp T-5000 USCAGS	1931110000	Sacramento	Sherman Island	Fish Wharf	Wharf
Air Camp T-5000 USCAGS	1931110000	Sacramento	Sherman Island	Boat House	Boat House
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	River Bunkhead	Bunkhead
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Hulk	Hulk
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Hulk	Hulk
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Hulk	Hulk
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	River Bunkhead	Bunkhead
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Draw Bridge	Bridge
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Heartwood (Town)	Town
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	River Bunkhead	Bunkhead
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Wooden Bridge	Bridge
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	River Bunkhead	Bunkhead
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Griffin Bros	Building
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Wharf	Wharf
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Lobby, Michael & Libby	Wharf
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Quater (Town)	Town
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	California Coast Cannery	Wharf
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Realty Cannery	Wharf
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Southern Pacific Wharf	Wharf
Air Camp T-5001 USCAGS	1931110000	Sacramento	Brannan Island	Island Greenhouse	Greenhouse
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 33	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 40	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 38	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 42 S	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 37	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 44	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 48	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 35	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 48 S	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Mathews	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 48	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 41	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Port Line Preserving	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 41 S	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 43	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 50	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	California Conserving Co	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 47 S	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 52	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Lobby, Michael & Libby	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 48 S	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 54	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 53	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	River (Town)	Town
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 55	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 56 S	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 58	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 59	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 56 S	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 61	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Ward, George (Town)	Town
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 61 S	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 53	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	STEAMBOAT SLOUGH PORTION OF MAP	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	River Island	Landing	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	River Island	Landing	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	River Island	Landing	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	Landing	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	River Island	West Steel Pole Howard Landing	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	Grand Island	East Steel Pole Howard Landing	Landing
Air Camp T-5002 USCAGS	1931110000	Sacramento	River Island	Howard Landing Ferry	Landing
Air Camp T-5019 USCAGS	1931110000	Sacramento	Grand Island	Union Oil Wharf	Wharf
Air Camp T-5019 USCAGS	1931110000	Sacramento	Grand Island	Standard Oil Wharf	Wharf
Air Camp T-5019 USCAGS	1931110000	Sacramento	Grand Island	Southern Pacific Wharf	Wharf
Air Camp T-5019 USCAGS	1931110000	Sacramento	Grand Island	Lobby, Michael & Libby No. 3	Landing
Air Camp T-5019 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 59 S	Landing
Air Camp T-5019 USCAGS	1931110000	Sacramento	Grand Island	Landing No. 70	Landing
Air Camp T-5019 USCAGS	1931110000	Sacramento	Grand Island	MacCathie B.72	Landing
Air Camp T-5019 USCAGS	1931110000	Sacramento	Grand Island	Smoke B.74	Landing

Air Camp T-5018	USCAGS	1931	10000	Sacramento	Grand Island	Landing No. 71	
Air Camp T-5019	USCAGS	1931	10000	Sacramento		Landing No. 72	landing
Air Camp T-5019	USCAGS	1931	10000	Sacramento	Grand Island	Grand Island 76	landing
Air Camp T-5019	USCAGS	1931	10000	Sacramento	Grand Island	Crocker 77	landing
Air Camp T-5019	USCAGS	1931	10000	Sacramento		Varden Landing	landing
Air Camp T-5019	USCAGS	1931	10000	Sacramento		Varden (Town)	town
Air Camp T-5019	USCAGS	1931	10000	Sacramento		McCallough 80	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Grand Island	Landing No. 79	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento		Tennessie 82	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento		Rutlyn 84	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Grand Island	Grasshopper 81	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento		Kanady 86	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento		Landing No. 83	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento		Landing No. 85	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento		Landing No. 92	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento		Landing No. 97	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento		Landing No. 94	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	STEAMBOAT SLOUGH PORTION OF MAP	
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Grand Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Sutter Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Grand Island	Goldman Ldg D-217	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Sutter Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Grand Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Grand Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Sutter Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Grand Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Sutter Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Grand Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Sutter Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Grand Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	MEER SLOUGH PORTION OF MAP	
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	D.C. Stewart	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	Private Ferry	ferry
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	Lane Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Prospect Island	Camp No. 1	camp
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	Chickery Wharf	wharf
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	Jewett T. Kider Ldg	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	W.A. Stuart Ldg	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	Prospect	Camp No. 2	camp
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	Abandoned Ferry	ferry
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	Sims Bridge	bridge
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	BUTTER SLOUGH PORTION OF MAP	
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	Landing	landing
Air Camp T-5003	USCAGS	1931	10000	Sacramento	River Island	Landing	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento	Sutter Island	Deback 88	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento	Sutter Island	Wedy 96	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento	Sutter Island	Landing No. 98	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento	Sutter Island	Paintersville	town
Air Camp T-5008	USCAGS	1931	10000	Sacramento	Sutter Island	Oliver Ranch 91	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento	Sutter Island	Landing 9-89	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento	Sutter Island	Landing No. 102	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento	Sutter Island	Landing No. 102 S	landing
Air Camp T-5008	USCAGS	1931	10000	Yolo	Morris Island	Landing No 95	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento		Courtland (Town)	town
Air Camp T-5008	USCAGS	1931	10000	Yolo	Morris Island	Sms 108	landing
Air Camp T-5008	USCAGS	1931	10000	Yolo	Morris Island	Hemp 997	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento		M. R. Ellis B-110	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento		T. W. Dear B-112	landing
Air Camp T-5008	USCAGS	1931	10000	Yolo	Morris Island	McFadden 01	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento		Greene B-112 S	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento		Landing No. 114	landing
Air Camp T-5008	USCAGS	1931	10000	Yolo	Morris Island	Hollister 116	landing
Air Camp T-5008	USCAGS	1931	10000	Yolo	Morris Island	Landing No 106	landing
Air Camp T-5008	USCAGS	1931	10000	Yolo	Morris Island	Landing No 106	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento		Simpson	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento		Landing No. 122	landing
Air Camp T-5008	USCAGS	1931	10000	Yolo	Morris Island	Hamminger 111	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento		Go-Down Landing	landing
Air Camp T-5008	USCAGS	1931	10000	Sacramento		Southern Pac Air Wharf	wharf
Air Camp T-5008	USCAGS	1931	10000	Sacramento		Wood (Town)	town

Air Comp. T-5008	USCAGS	1933	10000	Sacramento	Merritt Island	Pymans 115	landing
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Rail No. 15	wharf
Air Comp. T-5008	USCAGS	1933	10000	Yolo	Merritt Island	Nathens 115.5	landing
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Rosebud 128	landing
Air Comp. T-5008	USCAGS	1933	10000	Yolo	Merritt Island	Quakers 115.5	landing
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Landing No. 128	landing
Air Comp. T-5008	USCAGS	1933	10000	Yolo	Merritt Island	S. Smith 117	landing
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Bryans 120	landing
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Boysen Wharf House 122	landing
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Shel Oil Co. Wharf	wharf
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Union Oil Co. Wharf	wharf
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Clarksburg (Town)	town
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Nickles No. 136	landing
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Adams Lumber Wharf	wharf
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Sobbers Lower Landing 136.5	landing
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Edge Park Landing 138	landing
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Moore Landing 140	landing
Air Comp. T-5007	USCAGS	1933	10000	Yolo		Freeport Landing 127	landing
Air Comp. T-5007	USCAGS	1933	10000	Sacramento		Freeport (Town)	town
Air Comp. T-5007	USCAGS	1933	10000	Yolo		Wing Dam	wing dam
Air Comp. T-5007	USCAGS	1933	10000	Yolo		Gale Landing 142	landing
Air Comp. T-5007	USCAGS	1933	10000	Yolo		Wing Dam	wing dam
Air Comp. T-5007	USCAGS	1933	10000	Sacramento		Doppelbrook Landing	landing
Air Comp. T-5007	USCAGS	1933	10000	Yolo		Landing No. 145	landing
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Wing Dam	wing dam
Air Comp. T-5008	USCAGS	1933	10000	Yolo		Riverview Station (Town)	town
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Riverdale (Town)	town
Air Comp. T-5008	USCAGS	1933	10000	Yolo		Wing Dam	wing dam
Air Comp. T-5008	USCAGS	1933	10000	Sacramento		Butterville (Town)	town
Air Comp. T-5009	USCAGS	1933	10000	Sacramento		Union Oil Co. Wharf	wharf
Air Comp. T-5009	USCAGS	1933	10000	Sacramento		Associated Oil Co. Wharf	wharf
Air Comp. T-5009	USCAGS	1933	10000	Yolo		Capital Rice Mill Landing	landing
Air Comp. T-5009	USCAGS	1933	10000	Sacramento		PG&E Dock	dock
Air Comp. T-5009	USCAGS	1933	10000	Sacramento		Heenan Wharf	wharf
Air Comp. T-5009	USCAGS	1933	10000	Yolo		Heenan Rice Mills Landing	landing
Air Comp. T-5009	USCAGS	1933	10000	Yolo		Texas Oil Co. Wharf	wharf
Air Comp. T-5009	USCAGS	1933	10000	Sacramento		River Lines Dock	dock
Air Comp. T-5016	USCAGS	1933	10000	Sacramento	River Island	CAKES BLDG	shed
Air Comp. T-5016	USCAGS	1933	10000	Sacramento	River Island	Sunken Ore	beef loader
Air Comp. T-5016	USCAGS	1933	10000	Sacramento	River Island	Old Beef Loader	landing
Air Comp. T-5016	USCAGS	1933	10000	Sacramento	River Island	Hamilton Landing	landing
Air Comp. T-5016	USCAGS	1933	10000	Sacramento	River Island	Booth Landing 5	landing
Air Comp. T-5016	USCAGS	1933	10000	Sacramento	River Island	Old Beef Loader	beef loader
Air Comp. T-5016	USCAGS	1933	10000	Sacramento	River Island	WHEAT BLDG	landing
Air Comp. T-5016	USCAGS	1933	10000	Sacramento	River Island	Landing	landing



Chapter 3

SURVEY ESTIMATES

Electronic Survey, Field Verification





ELECTRONIC SURVEY

INTRODUCTION

Paragraph (c) of Item 3560-001-001 of the Supplemental Report of the 1986 Budget Act requires that the State Lands Commission prepare a cost estimate for an electronic survey of the Sacramento River. The purpose of the survey is to locate the position of submerged vessels and artifacts and to determine the geological composition of the riverbed at specific locations. The electronic instruments to be used include magnetometers, side-scan sonar, and sub-bottom profilers. The results of this phase of the project will greatly assist in determining the priority of selected locations.

Evidence of sinkings discovered during the document research does not necessarily pinpoint the location of the occurrence. It is anticipated that the electronic survey will fix the location of the sunken vessel, making the task of field verification easier. The final product will be a report of the analysis of the survey supported by site maps depicting the location of suspected archaeological finds, and charts showing the probable geological composition of the river bed. These will be supported by captains' logs, equipment operators' logs and field survey notes.

Objectives of Electronic Survey

Two objectives will be accomplished with this survey:

1. Suspected archaeologically significant objects will be electronically located and their positions noted.
2. The river bed will be mapped at selected locations to the extent that water depths and siltation depths will be known.

Objective of Mapping

Mapping at selected locations will consist of the following:

1. Vicinity map. This will show the selected site in relation to Sacramento County (Exhibit A).
2. Site map will show approximately 6000 feet of river per sheet at a scale of 1 inch = 200 feet (Exhibit B).
3. Detail map will show the site at a scale of 1 inch = 1 foot, or at a scale that will render the most accurate detail (Exhibit C).
4. Map sheets will be 24 inches x 34 inches.

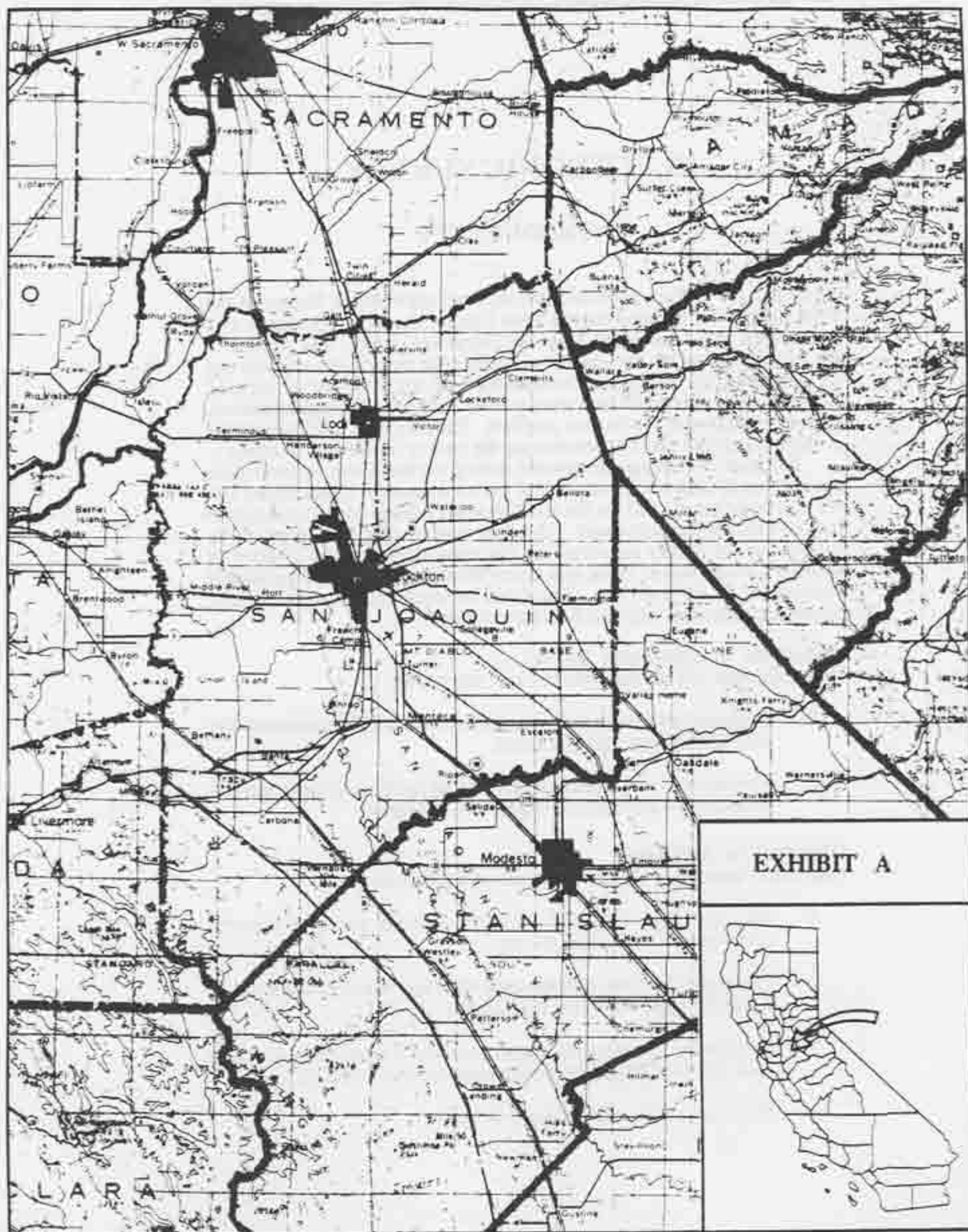




Figure 15. - Vicinity Map. This map shows the general vicinity of the project in relation to the state.

Project Area

The project area for the electronic survey is defined by the legislature as the Sacramento River, from the I Street Bridge, in Sacramento to the westerly tip of Sherman Island. A distance of approximately 60 miles. Also included in this proposal is Steamboat Slough (approximately 12 miles), and Sutter Slough (approximately 6 miles). The total length of waterways is 78 miles.





Figure 16 - Site Map 1" = 200'. This is representative of the maps produced by the State Lands Commission. Although the maps produced for this project may not include many of the ownership lines, all topographic features will be shown.

Channel Changes In Project Area

The Sacramento River, within the project area, is almost entirely situated in its natural channel. That is, it has not been rechannelized by man. This study has located only one significant artificial cut or rechannelization of the riverbed. Decker Island, which lies northerly of Sherman Island, was created by an apparent cut. The cut was made to straighten the Sacramento River, and at the same time, separated Decker Island from the upland known as Montezuma Hills. With this exception, the Sacramento River will be considered to be in this historically natural position. Steamboat Slough and Sutter Slough were included in this portion of the study because historical maps and charts have depicted these two sloughs as the Sacramento River. Consequently, these two water courses were navigated as the Sacramento River.



[illegible]



PROPOSED ELECTRONIC SURVEY AND MAPPING OPERATIONS

Preliminary Activities

The total length of the river to be investigated exceeds 60 miles. The cost to search each square mile would be very costly. It is however both appropriate and more economical to identify potential sites of underwater archaeological artifacts by review and evaluation of documents which locate areas of ships anchorages, berthing locations and accidents. Once the sites are identified there still remains the problem of locating artifacts in murky water and sand.

The most appropriate way to pinpoint the exact location of potential submerged artifacts is by the use of electronic devices that rely on sound transmission and that measure magnetism.

Electronic Survey Operation

The electronic equipment used to conduct the underwater survey of previously selected sites includes side-scan sonar, sub-bottom profiler and magnetometer.

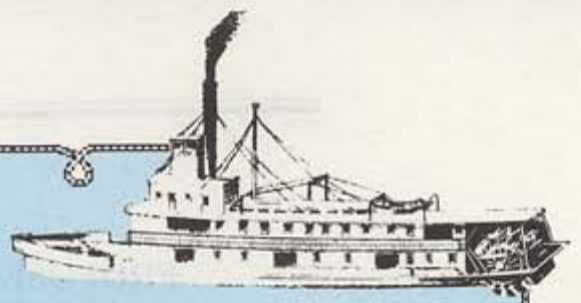
Side-Scan Sonar: An echo sounding device towed beneath the boat that provides a graphic picture of items resting on or above the bottom surface.

Sub-bottom Profiler: An echo sounding device that is a high power, low frequency sonar which penetrates the bottom surface and provides a graphic picture of buried solid objects. This instrument is very reliable in a mud and silt bottom, however, it is not very useful in heavy sand or gravel.

Magnetometer: A device that measures and records the steady force of the earth's magnetic field. It is limited to a bottom that is reasonably smooth and magnetically constant.

The electronic search will provide a chart of the selected areas with real targets for future exploration by divers. The search consists of passing through the survey area with side-scan sonar to identify items on the bottom surface. The sub-bottom profiler is then used to penetrate the sediment charting the shape of buried items. Next the magnetometer is used to identify the presence of iron materials.

The survey will be performed by professional scientists and marine technicians with extensive experience and training in submarine data acquisition and interpretation. A boat, such as a Navy Landing Craft, 36 feet long, provides an ideal platform for instruments and operators. It is also an excellent diving platform. However, any boat that would provide a minimum of 10 feet of deck space will accommodate the equipment and operators.

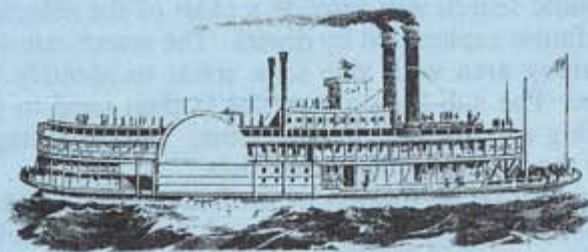


RACING ON THE SACRAMENTO

The California Steam Navigation Company never held an iron-fisted control over the River, and though it tried to discourage racing, it could not stop it altogether. One opposition company which ran against CSNC was the California Navigation and Improvement Company, organized by Captain G.W. Kidd, the "pestiferous" owner of the *Nevada* and *Washoe*.

Newspaper accounts show the *Nevada* liked to chase the *Antelope*, a smaller but faster steamer, with the intention of ramming her. And, at Benicia once, the *Nevada* went after the *New World*, but the latter boat pushed the *Nevada* up on a mudbank.

The rivalry between the two steamers continued. During one especially close race, the *Nevada* tried to cut in front of the *New World*, but the latter chased the *Nevada* into Steamboat Slough where the *Nevada*, more concerned with staying ahead than watching the channel, was snagged. Mired in quicksand near Cache Slough, the *Nevada* became a total loss.





Mapping Operations

Mapping in support of the electronic survey will begin with the inventory of all possible sites. Existing maps, historical and current, will be included in the document search portion of the report. These maps will also serve as the basis for more specific mapping on sites selected for the electronic survey. This phase of the project is vitally important to any recovery efforts. Suspected sunken ships or artifacts discovered electronically will be accurately plotted at the time of the finding. This will decrease the diving time. At the rate of \$1500.00 a day, diving time would be better used for the recovery of artifacts, not in the search.

As outlined in Section II of this estimate, mapping at each site will consist of three types of maps: vicinity map, site map, and detail map. Existing maps, Exhibit A, will be used for the vicinity map to show the relation of the site to Sacramento County. The site maps, Exhibit B, at a scale of 1 inch = 200 feet, will be drawn in as many sheets as required to cover a site. It is anticipated that a scan for a sunken ship could will be at least a mile. Scans could be as long as six miles depending on the accuracy of the reports in the document search.

Horizontal control is defined as points on the face of the earth that have a known position with reference to a particular datum. For instance, (see Figure 18) nautical charts have lines of latitude and longitude as the reference datum. Geographic coordinates, latitude and longitude, are used to locate the horizontal position of points on the curved surface of the earth. Another example of reference datum in common use is the California Coordinate System (CCS). The CCS is based on geographic coordinates. Two of the more significant differences is that it uses the foot as the unit of measurement and maps based on the CCS assume that the earth is flat. A reference datum is a basic requirement for accurate mapping.

Research for horizontal control shows that there is none available in the immediate area. This does not pose a threat to the accuracy of the mapping. It only implies that the mapping will not be referenced to an established datum. Instead of using the California Coordinate System, or latitude and longitude, an assumed datum will be used. An assumed datum is very similar to the CCS in that it uses the foot as the unit of measure and the mapping assumes a flat surface.



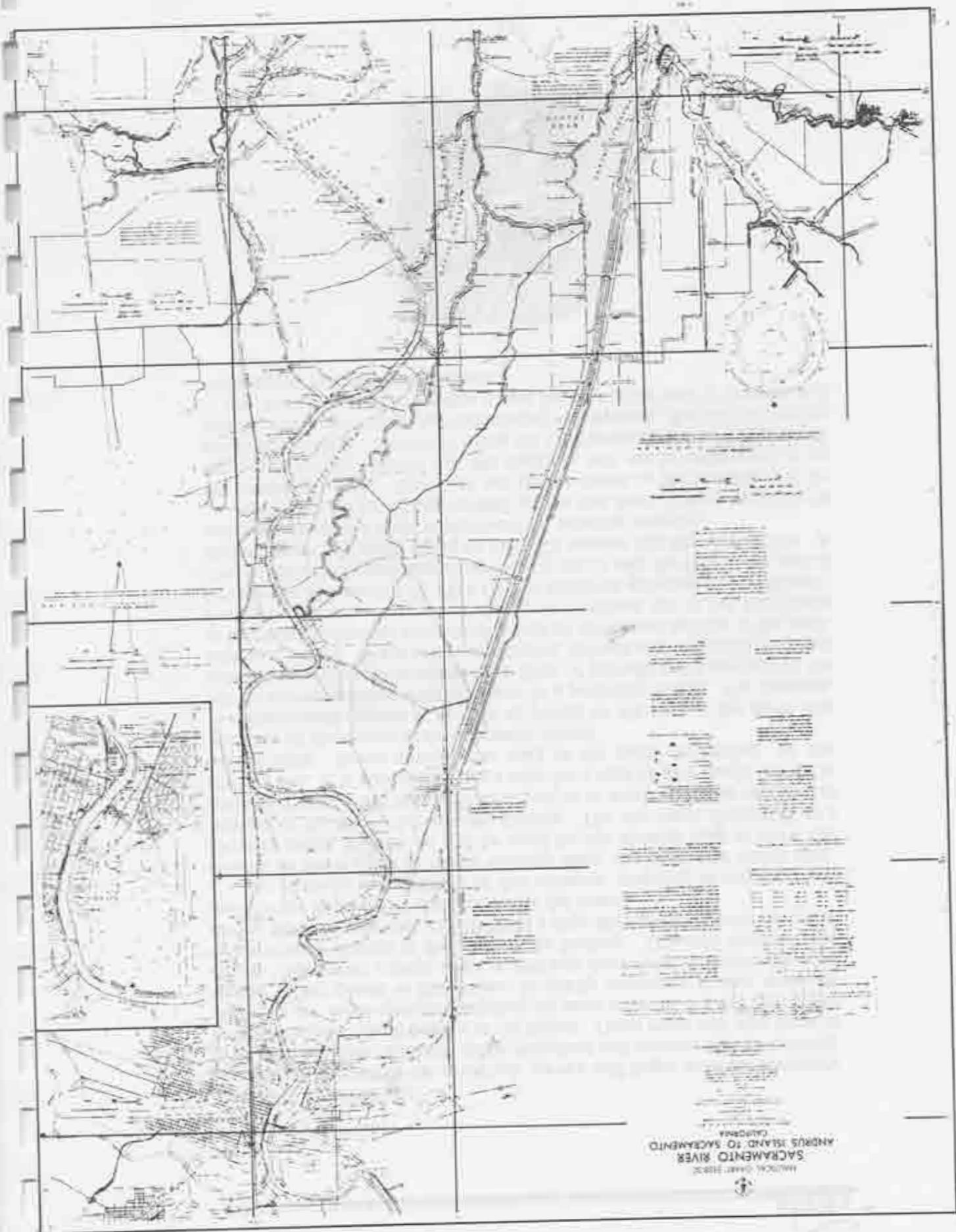




Figure 18. Nautical Chart 5528SC. The grid on this chart represents the lines of latitude and longitude. The grid spacing is at five minute intervals. The horizontal position of any point on this chart can be calculated from the nearest grid lines.





A field survey required for mapping will consist of the following for each site:

1. Reconnaissance of the site to determine the position of the horizontal control points to be established. The physical point will be reinforcing iron, 3/4 of an inch in diameter, 30 inches long, with an aluminum survey cap, set in the ground. The cap will identify the monument as a State Lands Commission survey marker. Permanence and stability are factors that are considered in positioning control points.
2. Control points will be spaced 1000 feet apart along the length of the site. The positions of each control point will be referenced to existing topography. The topographic survey will plot the location of the river's edge, roadways, natural and manmade features such as telephone poles, utility lines, and houses. This will aid in the recovery of the points at a later date. If possible, the points will be set on top of the levee, on the same side of the river as where the sunken ship is expected to be.
3. Field survey for control will be the measurement of the horizontal angle and the distance between succeeding points. This series of points, an open traverse, will be the basis for mapping.
4. As the electronic survey is proceeding, the position of the boat will be tracked by theodolite and electronic distance measurer (EDM) and its position noted. Communication between the boat and the survey crew will enable an accurate plot of the boat as it passes over suspected archaeological finds.

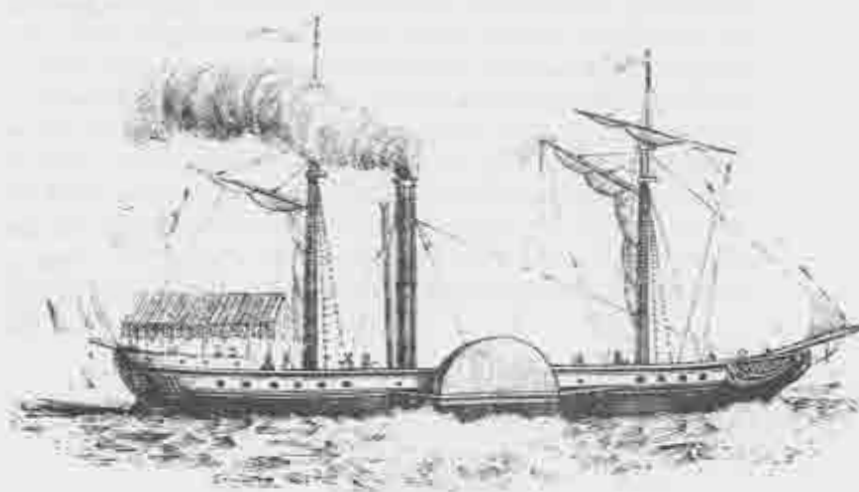
The field survey in support of an electronic survey for the entire project will be somewhat different. Control points will be set further apart and the topographic surveying will be at a minimum. The field work will be only sufficient to locate the position of the boat doing the electronic survey. No maps will be produced from this operation unless potentially significant targets are discovered.

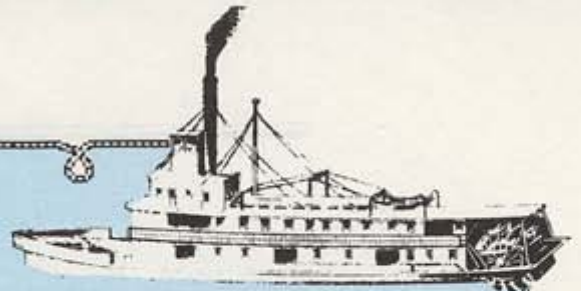
The survey operations at this point will have been sufficient to complete the vicinity map and site map. The survey for the detail map, Exhibit C, will occur at the time of an exploratory dive. Supplemental horizontal control will be set, having the points 100 feet apart and closer to the waters edge. Vertical control for the survey will be by river gage observation.

The survey and mapping of an archaeologically significant site on dry land is also anticipated. The survey and mapping operations will be similar to the underwater mapping operations. The horizontal control and topographic survey will be as previously described, however, more attention will be given to detail. Another aspect of an archaeological site is



the ownership of the land. The riverbed is under the jurisdiction of the State Lands Commission. The ownership of an upland location may fall into private ownership and the location of an archaeological site may have to be legally described. This will not pose a problem, but it is a variation of the river survey.





RAISING THE NEVADA

For the most part, steamship companies and their insurers were vague about reporting exact locations of vessel sinkings. Due to silting from hydraulic mining, the river bed had been raised several feet; if in shallow water a ship could be easily stripped by opportunists. In this rare newspaper article, the recovery of the steamer *Nevada* is revealed.

Many of the city papers have published a statement to the effect that, owing to seeming insuperable difficulties, Mr Fell had abandoned the attempt to raise the hull of this steamer from a place where she now lies, off Washington point, opposite Rio Vista, on the Sacramento River. This, we are informed, is an error. The contractor, like Gen McClellan, has only changed his "base of operations." The first plan was to pump her out by hydraulic process; but it was found that she was so deeply imbedded in the mud--a bar being formed around her, and some ten feet of deposit on the stern--it would result in breaking the boat up, and was accordingly abandoned. This probably gave rise to the report that no further effort would be made. It is proposed, by the aid of a sort of coffer dam (which is nearly completed) around the hulk as it lies, to secure a clear space for the removal of the superincumbent mass of river mud, and the effective application of the hydraulic power, whereby Fell hopes to bring the boat to the surface in about twenty days' time, more or less.

—*Sacramento Union*, March 3, 1861





COST ESTIMATES

The Electronic Survey - Contracted Work

The estimated cost per day for equipment and operators, not including positioning devices, or survey teams are:

Boat and operator	\$300.00
Side-scan and operator	\$550.00
Sub-bottom profiler	\$750.00
Magnetometer and operator	\$550.00
Mobilization (one time cost)	\$1000.00

Each instrument has a different range of coverage, therefore, each scan will be performed independently of the others. Just as the range of each instrument varies, so does the area that can be surveyed in one day. The following are cost estimates for the equipment and operators for an electronic scan on seventy miles of river, the entire project area:

Side-scan sonar and operator: 24 days @ \$550 =	\$13,200.00
Boat and operator: 24 days @ \$300 =	\$7,200.00
Sub-bottom profiler and operator: 70 days @ \$750 =	\$52,500.00
Boat and operator: 70 days @ \$300 =	\$21,000.00
Magnetometer and operator: 24 days @ \$550 =	\$13,200.00
Boat and operator: 24 days @ \$300 =	<u>\$7,200.00</u>

Sub Total: \$114,300.00

Per-diem for two boat operators: 118 days @ \$82 x2 = \$19,352.00

Mobilization: \$1,000.00

Total: **\$134,652.00**

Note: The side scan estimate is based on an average of four passes per section of river and an average coverage of three miles per day. The same coverage data was used for the magnetometer estimate. The sub-bottom profiler estimate was calculated on the basis of 15 to 20 passes per section of river and coverage of one mile per day.

The following is the cost estimate for a individual site or a single mile of river (*mobilization for less than 1 day not considered*):

Side-scan sonar and operator:	\$550.00
Boat and operator:	<u>\$300.00</u>
Side-scan cost: (yields 3 miles per day)	\$850.00/day
Sub-bottom profiler and operator:	\$750.00



Boat and operator:	<u>\$300.00</u>
Sub-bottom profiler cost: (yields 1 mile per day)	\$1,050.00/day
Magnetometer and operator:	<u>\$550.00</u>
Boat and operator:	<u>\$300.00</u>
Magnetometer cost: (yields 3 miles per day)	\$850.00/day
Per diem: 2 x \$82 for 1 day =	\$164.00
Mobilization cost:	<u>\$1,000.00</u>
Cost for all three operations:	\$3,914.00/day

Note: The side-scan sonar estimate was based on four passes over a mile of river or an isolated site. Additional time was calculated for start-up. The same time and coverage was estimated for the magnetometer. The sub-bottom profiler estimate was based on 15 passes over a mile of river or an isolated site. A mobilization or start-up charge of \$1000 will be required for each survey site.

The Electronic Survey - SLC Equipment

In preparation of these cost estimates, an alternate operation plan was developed. Consideration was given to the purchase of the electronic equipment necessary to perform the survey and the training of personnel in its use. This project is the first of its type and is limited in area to only a small fraction of the wetlands under the jurisdiction of the Commission. Historical research projects can be developed to study other potentially significant sites. This project, and future projects, could be surveyed at reduced cost if the Commission had the electronic equipment for the underwater survey and trained operators.

The first step taken to explore the possible purchase of equipment was to arrange for demonstrations of the various instruments. The side-scan sonar, sub-bottom profiler, and magnetometer were selected as the instruments to be evaluated. Nearly one hundred letters were sent out to electronic equipment manufacturers, vendors, and dealers inviting them to demonstrate their equipment on the Sacramento River. Two representatives agreed to demonstrate the requested instruments.

Rick Whitney of Whitney & Associates, Inc. arranged for the demonstration of the E G & G side-scan sonar and magnetometer, and the Datasonics, Inc. sub-bottom profiler. Carl Moller of C & C Moller, Inc. demonstrated the Kline side-scan sonar and sub-bottom profiler. The instruments being demonstrated were considered to be of the latest technology.

The purpose of the demonstrations was to determine if it would be to the States advantage to purchase the equipment. An alternative would be to subcontract the work out. The equipment was evaluated for the following factors:

1. Ease of use
2. Training required to acquire and interpret data



3. Accuracy
4. Resolution
5. Cost

The Sacramento River, from the Miller Park boat ramp to the Tower Bridge, was used as the testing site. The demonstration area included that portion of the river searched last year by Bob Taylor and Associated Divers. The test area was to be the same for all demonstrations. This would allow for a comparison of results.

On May 11, 1987, Rick Whitney arranged for Ron Royal, Terry S. Snyder, Dave Porta, and John Ingenito to be in Sacramento for the on-site demonstrations. The State Lands Commission boat, Wet Dog, was used as the support vessel.

Ron Royal demonstrated the E G & G Recording Proton Magnetometer Model G-866, Figure 19. This instrument was extremely compact, and apparently easy to operate; the output was both in digital and graphical form, Figure 20.

Terry Snider demonstrated the E G & G Model 260 Image Correcting Side-Scan Sonar and Model 272TD Tow Fish, Figure 21. Although this instrument is larger than the magnetometer, it is still compact. The recorder is cubical in shape, measuring approximately 20 inches to the side. The output is in paper form and was easy to read, Figure 22.

Dave Porta and John Ingenito demonstrated the Datasonics SBP-5000 Sub-Bottom Profiler, Figure 23. The equipment was in three separate units: the control unit, the plotter, and a "catamaran transducer vehicle." The printout from this instrument, Figure 24, was not as easily read as the other records and required some interpretation.

On May 13, 1987, Carl Moller demonstrated the Klein Side-Scan Sonar and Dual Channel Recorder Model 421. This piece of equipment has the capability to record both side-scan sonar and sub-bottom profile. Figure 25 shows a sample of the output. Although it was not available for a demonstration, the Klein Digital Sonar, System 590 (Figures 26 & 27) is the newer model with improved recording abilities.

Approximate prices are:

Side-scan sonar	\$70,000.00
Sub-bottom profiler	\$45,000.00
Magnetometer	\$17,000.00

The exact prices are dependent on the model, and additional support equipment required or ordered.

Cost Estimates For The Project:

Electronic Equipment Purchase	\$132,000.00
Time Required: 118 Days	
Boat & Operator: 118 x \$300.00	\$35,400.00
Assoc. BDO operator: 118 x \$383.00	<u>\$45,200.00</u>
TOTAL	\$212,600.00



Recording Proton Magnetometer Model G-866



Figure 19.- EG & G Recording Proton Magnetometer Model G-866.
Photo courtesy of EG & G Geometrics.

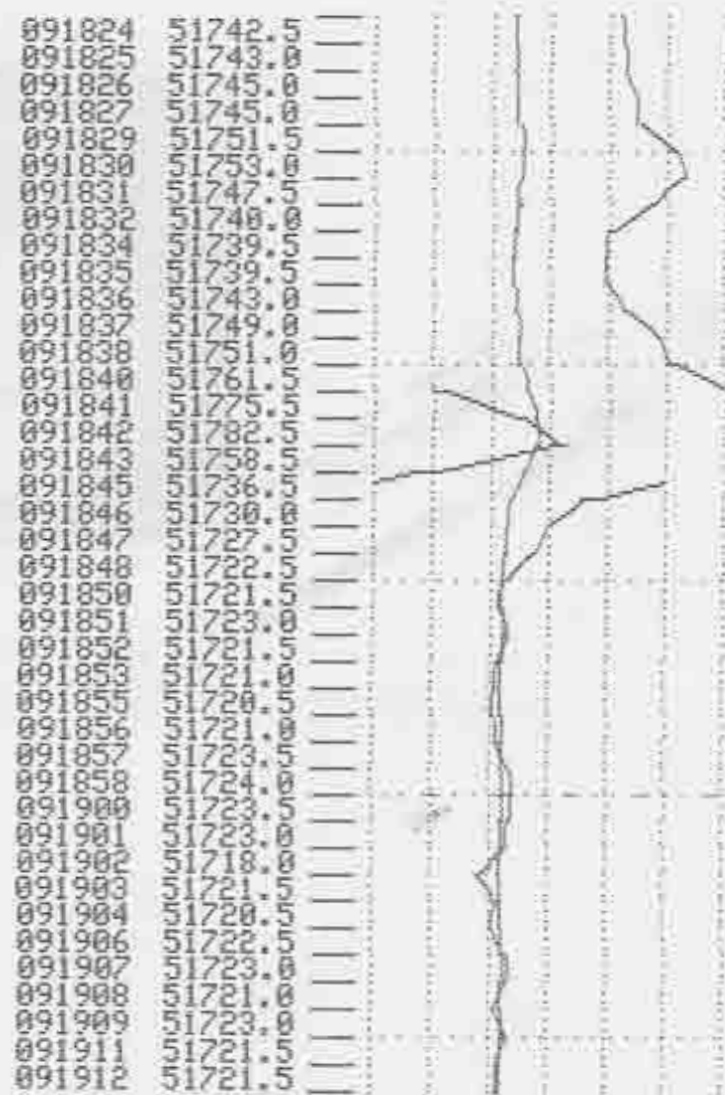


Figure 20. - Output from the EG & G Magnetometer Model G-866. This portion of the magnetometer record shows the time and gamma reading on the columns on the left side of the tape. The plotted line on the right is of the gamma reading. Spikes in this plot indicate the presence of magnetic materials. A spike is shown at 9:18:42. The plotted line on the left is of the gamma readings at a flutter scale.

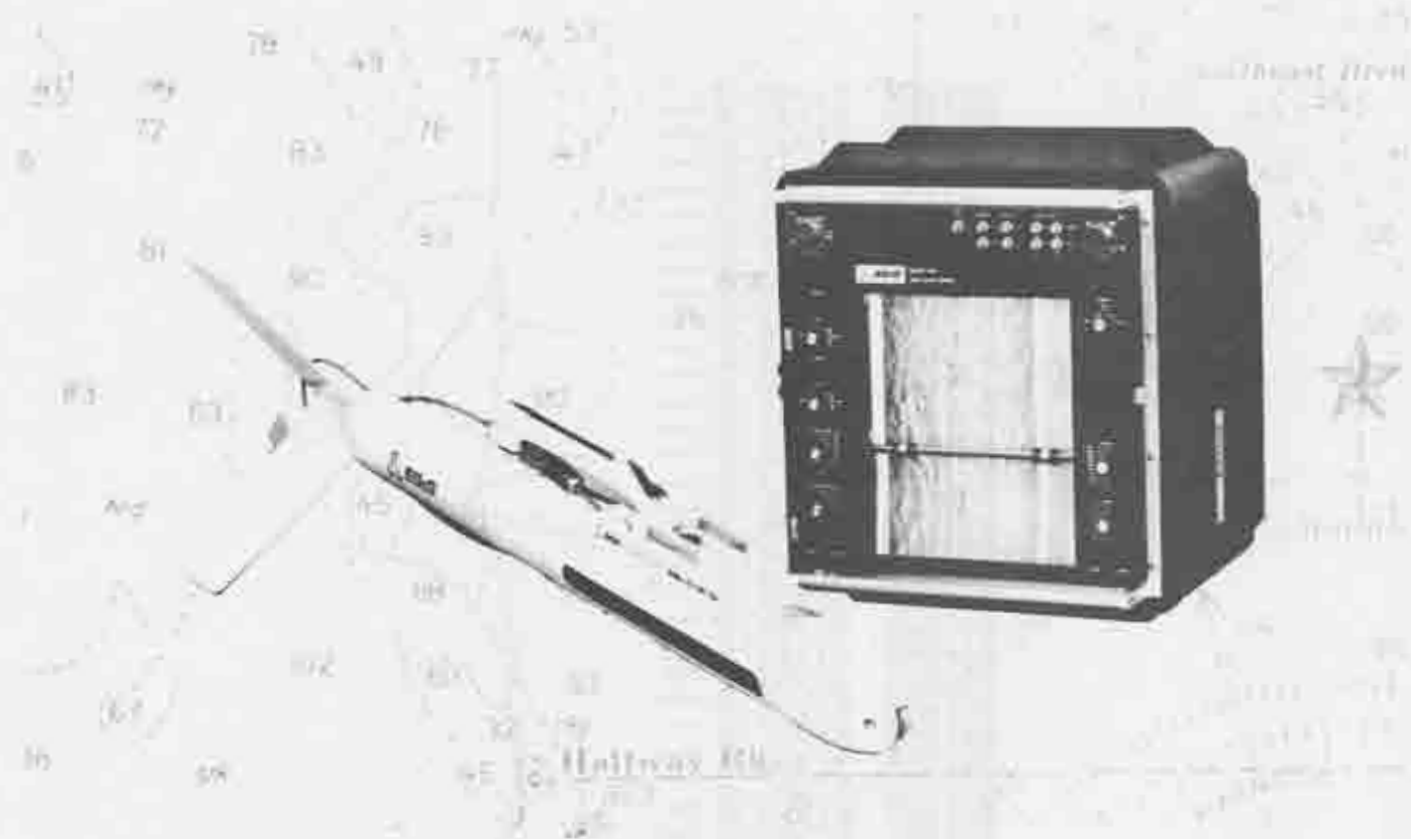


Figure 21.- EG & G Model 260 Side-Scan Sonar and Towfish. Photo courtesy EG & G Environmental Equipment

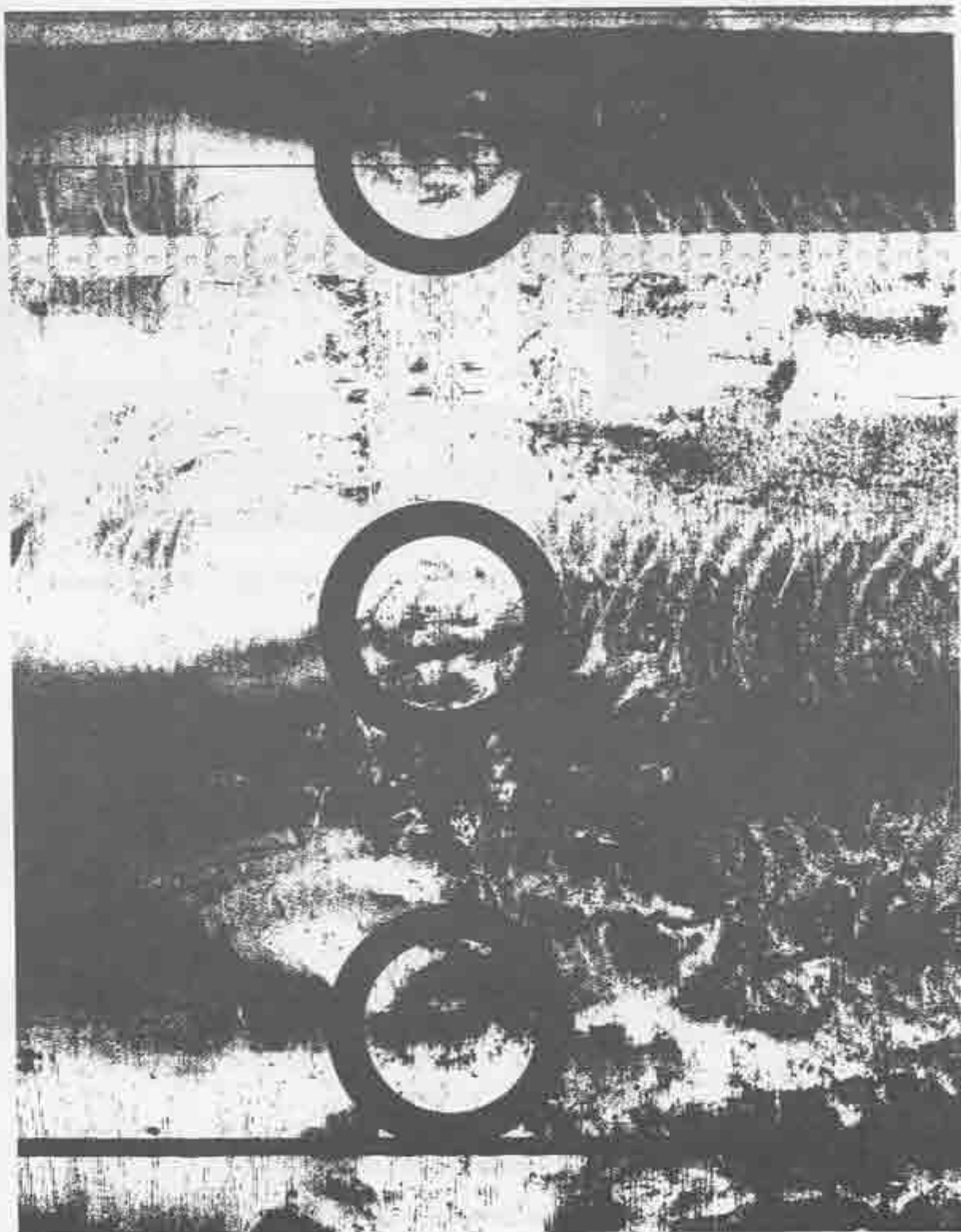


Figure 22.- Output from the EG & G Side-Scan Sonar. This is a copy of the record of the Sacramento River at the Tower Bridge. The center line is the path of the boat. On the original plot, bridge columns (circled) are clearly shown.

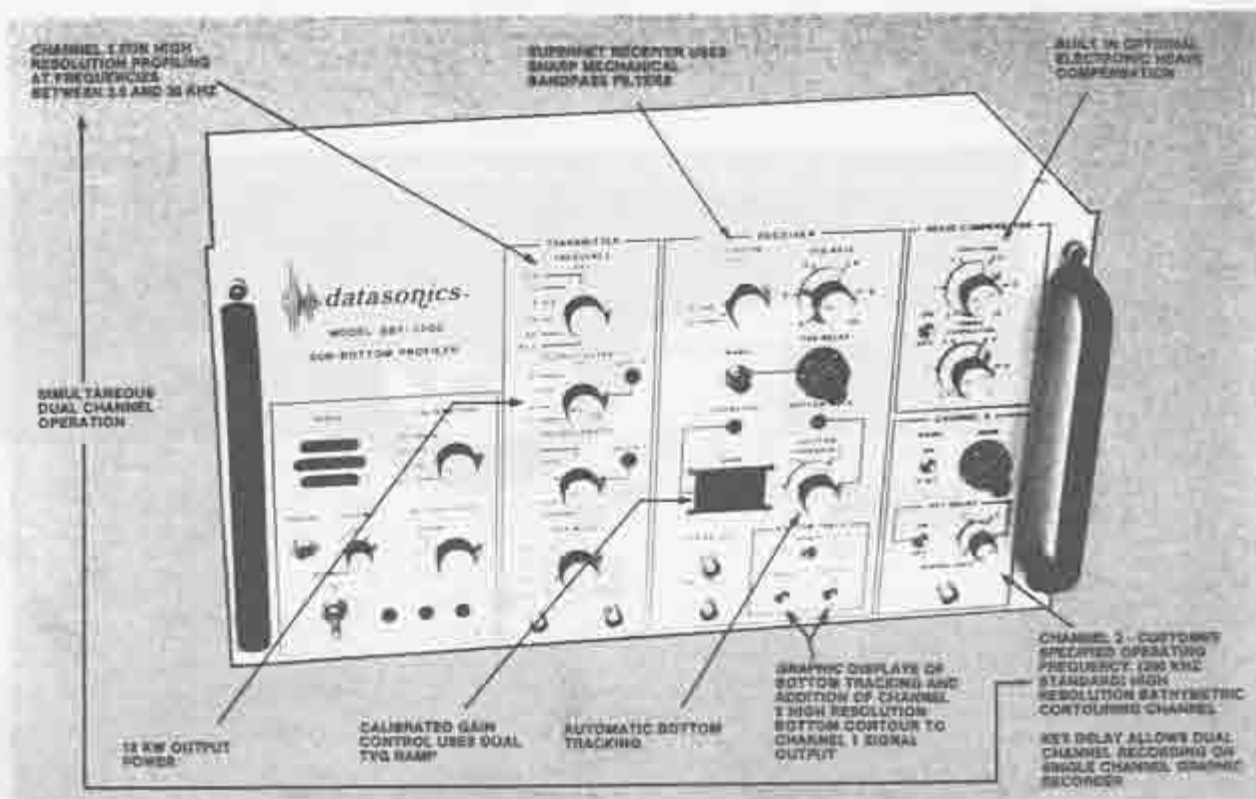


Figure 23:- Datasonics SBP-5000 Sub-Bottom Profiler. Photo courtesy of Datasonics, Inc.

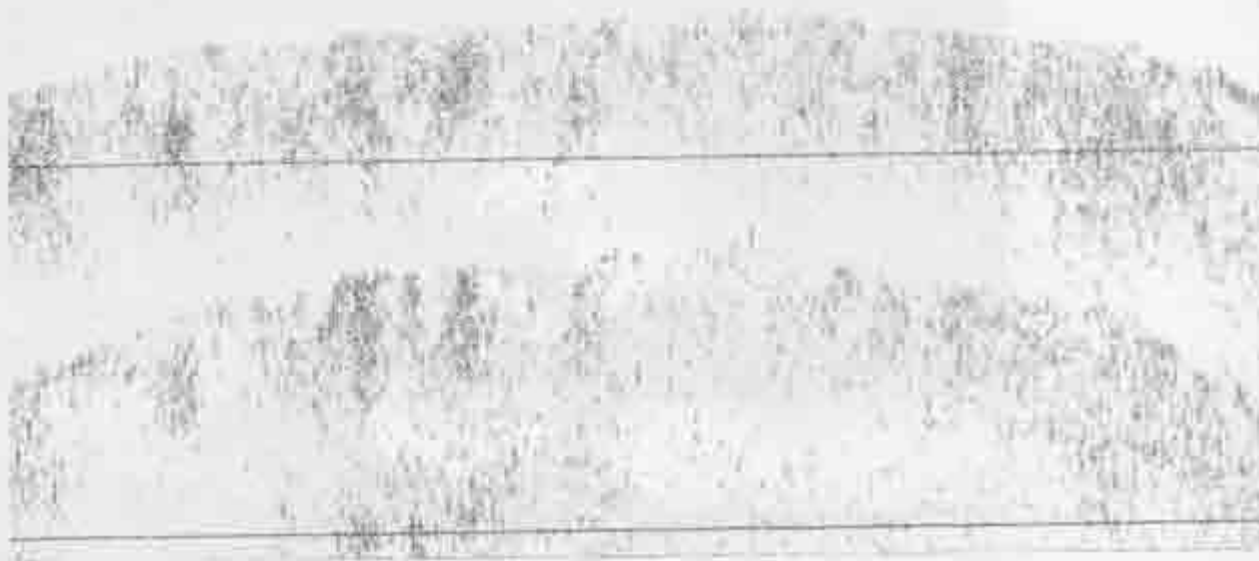


Figure 24:- Output from the Datasonics SBP-500 Sub-Bottom Profiler. This is a copy of the record of the sub-bottom profiler taken of the Sacramento River. An echo of the signal is also shown as an equidistant shadow to the river bottom.

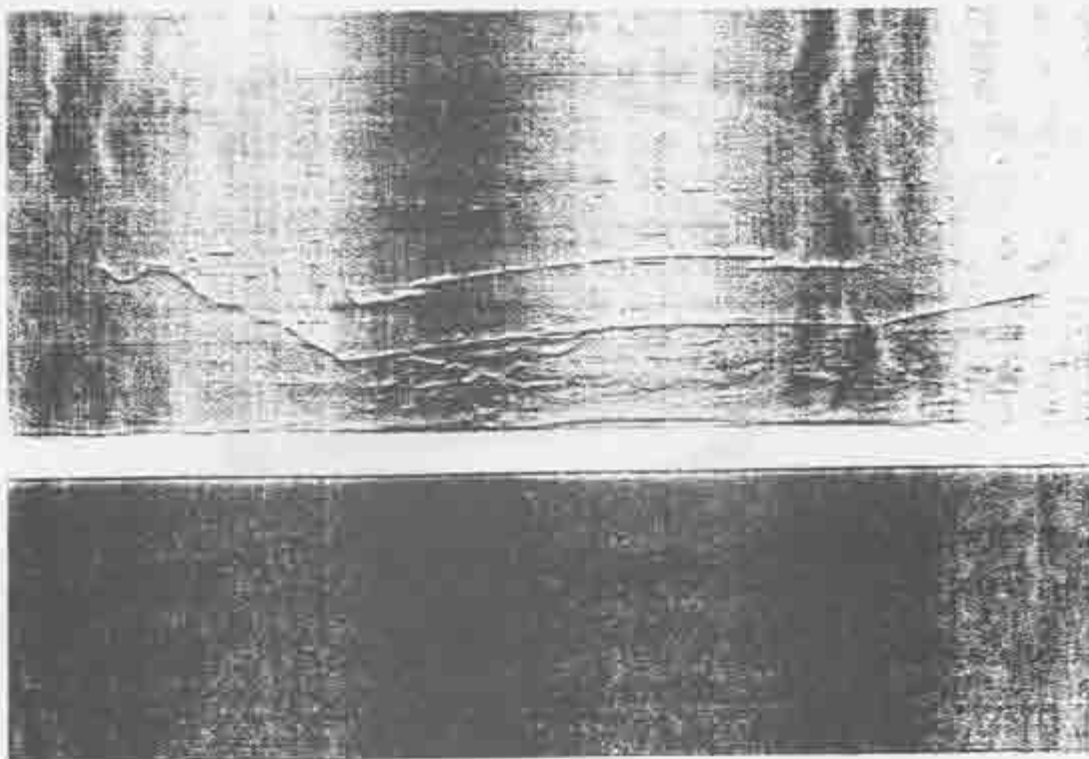


Figure 25. - Output from the Klein Model 421 Dual Channel Recorder. Sample output of the 421 Recorder. This record was taken at the Sacramento River in the vicinity of the Tower Bridge. The upper half of the record is the left channel of the side-scan sonar. The lower half is the record of the sub-bottom profiler.



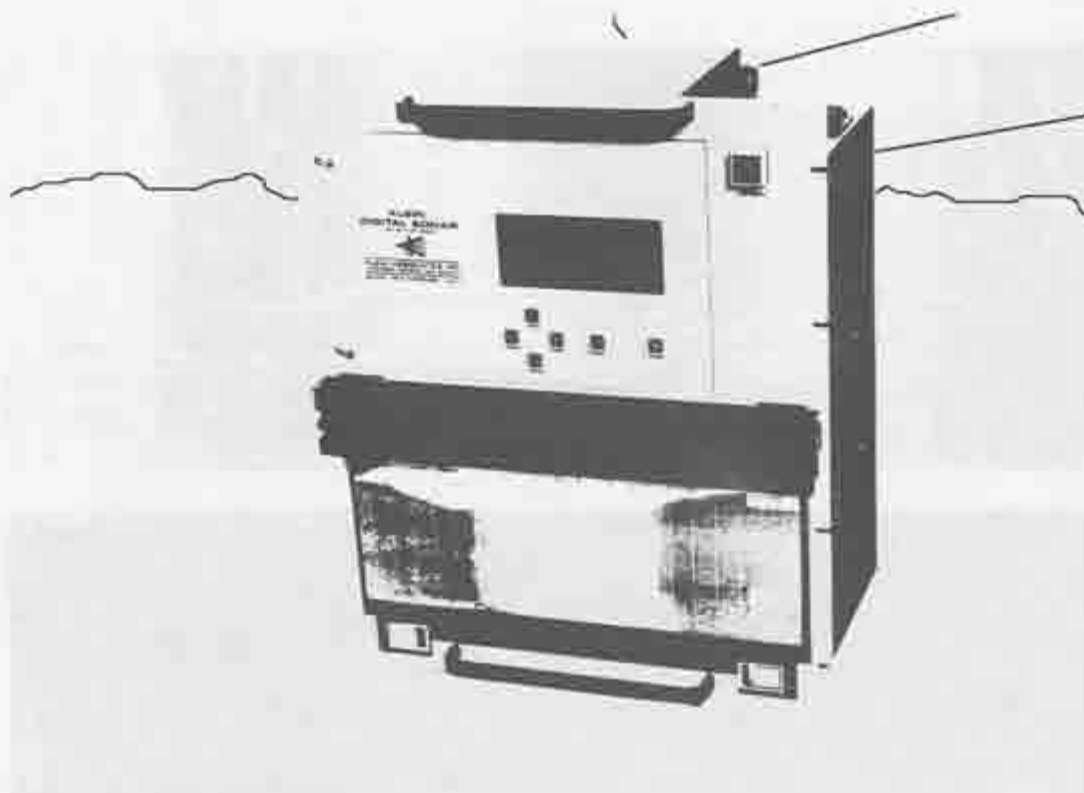


Figure 26.- The Klein Model 590. This is the current "top of the line" system from Klein. This recorder has the capability to record side-scan sonar and sub-bottom profile simultaneously. Photo courtesy of Klein Associates, Inc.

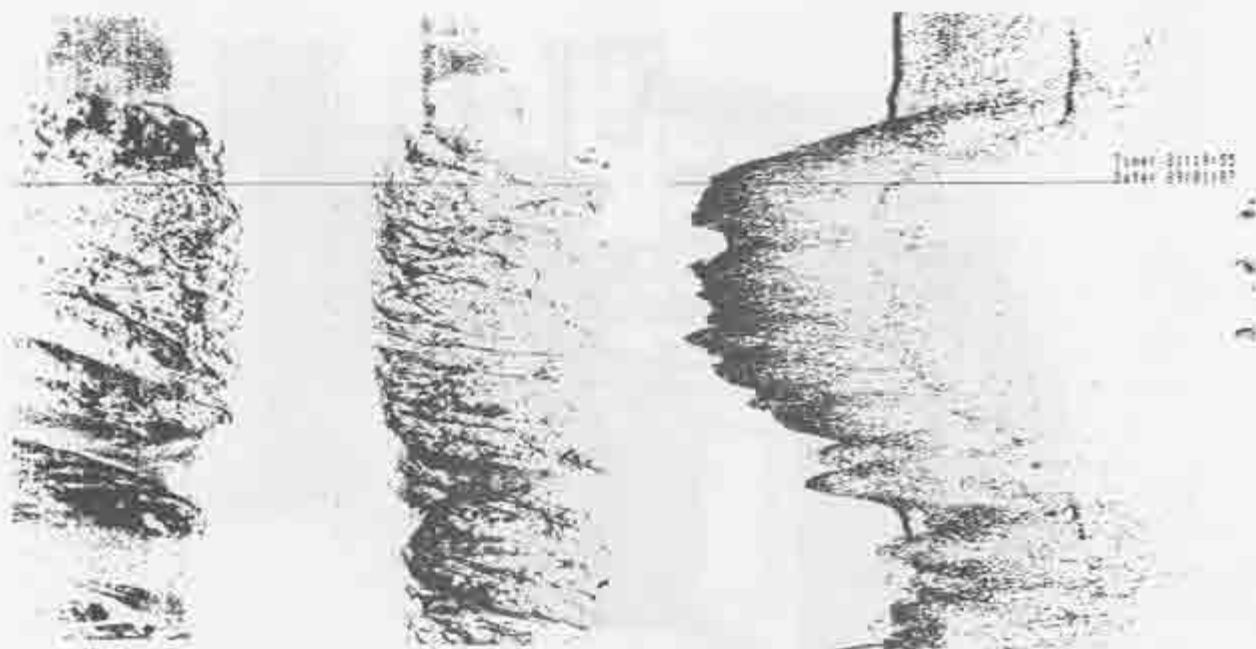


Figure 27. - Output from the Klein Model 590. This record has noticeably more resolution than the Model 421. The upper portion of the record is the left and right channels of the side-scan sonar. The lower portion is the record from the sub-bottom profiler. The "event mark" notes the date and time. The location of where this record was taken is unknown.



THE WASHOE

Another of Captain Kidd's steamers, the *Washoe*, led a short, violent life. Competition between steamers, even when docking, was often cut-throat. When the *New World* tried to tie up at Benicia, the *Washoe*, close on her heels, opened up her engines to try to cut ahead, dock first, and thereby monopolize the wharf. The pilot of the *New World*, not to be bested, countered by ramming the *Washoe*, which sank in a few minutes. The *Washoe* did not stay down long. She was raised and repaired, only to be involved in another devastating accident.

On September 5, 1864, the *Washoe*, *Yosemite* and *Antelope* were racing on the Sacramento--the swift *Antelope* as usual had pulled ahead, and the *Yosemite* and *Washoe* were neck and neck. Five miles above Rio Vista the starboard boiler of the *Washoe* burst and she immediately began filling with water. The *Antelope* turned back, and making her way slowly in the fog, found the *Washoe* burning out of control. She then ferried the injured to Sacramento. When a final tally was made, nearly twenty passengers had died and scores were wounded. It was the worst accident on the Sacramento.

Captain Kidd, unyielding in his desire to keep his steamships running, again raised the unlucky *Washoe* and put her back in service. But unlucky she remained--after a few more accidents she caught fire in 1878 and sank for good.





The Field Survey and Mapping

The field survey in support of the electronic survey will be performed by staff of the State Lands Commission. Typically the crew will be composed of:

One Associate Boundary Determination Officer (Assoc. B.D.O.)
Two Assistant Boundary Determination Officers (Assist. B.D.O.)
One Boundary Determination Technician

Salaries for crew personnel are as follows:

Assoc. BDO	\$47.88
2 Assist. BDO's	\$81.20
BD Tech.	\$31.44
Total per hour	<u>\$160.52</u>
Total per day	\$1,284.16

This estimate is based on fiscal year 1987/88 salaries.

The estimate for the field work to support the electronic survey over the entire project is:

Reconnaissance	15 crew days
Set survey monuments	20 crew days
Traverse	<u>50 crew days</u>
Total	85 crew days
Field Survey Cost, Project Total	\$109,154.00

The estimate for the field work on a site, one mile long, is:

Reconnaissance	1/2 crew day
Set survey monuments	1/2 crew day
Topographic survey	1 crew day
Traverse	2 crew days
Boat positioning	<u>3 crew days</u>
Total	7 crew days
Field Survey Cost, Site Total	\$8,989.00

The cost for a survey of an archaeologically significant site on dry land is estimated as follows:

Reconnaissance	1 crew day
Set survey monuments	1 crew day
Topographic survey	2 crew days
Traverse	<u>2 crew days</u>
Total	6 crew days
Survey Cost, Archaeological Site Total	\$7,705.00



The maps produced as the result of the field surveys will be drawn by Commission staff. The office team will consist of one Associate Boundary Determination Officer and one Assistant Boundary Determination Officer. Time requirements for mapping is one week for either a site or a mile of river survey. The cost is summarized as follows:

Associate BDO	$\$47.88 \times 40 =$	<u>\$1,915.00</u>
Assistant BDO	$\$40.62 \times 40 =$	<u>\$1,625.00</u>
Map Cost	Total	<u>\$3,540.00</u>

Cost Summaries

- Cost for an electronic survey (contracted) and field survey (SLC) over the entire project area:
 - Field Survey (*Details, pg. 154*) \$109,150.00
 - Electronic Survey (*Details, pg. 143*) \$134,652.00
 - TOTAL \$243,802.00
- Cost per mile or individual site for an electronic survey (contracted), field survey (SLC), and mapping:
 - Field Survey (*Details, pg. 154*) \$8,990.00
 - Electronic Survey (*Details, pg. 143&4*) \$3,914.00
 - Mapping (*Details, pg. 155*) \$3,540.00
 - TOTAL \$16,444.00
- Cost for a survey and mapping of an archaeological site on the upland:
 - Field Survey (*Details, pg. 154*) \$7,705.00
 - Mapping (*Details, pg. 155*) \$3,540.00
 - TOTAL \$11,245.00
- Cost for the purchase of electronic equipment and survey (by SLC) over the entire project area:
 - Purchase side-scan sonar unit \$70,000.00
 - Purchase sub-bottom profiler unit \$45,000.00
 - Purchase magnetometer unit \$17,000.00
 - Field Survey (*Details, pg. 154*) \$109,150.00
 - Electronic survey (by SLC staff) \$80,600.00
 - TOTAL \$321,750.00



EXPLORATORY DIVE

On June 16 and 17, 1986, an exploratory dive was made in the Sacramento River. The purpose of this dive was to:

1. Determine how much area can be covered in a day of diving.
2. Determine the geologic make-up of the river bottom.
3. Search for artifacts dating to the 1800's.
4. Determine the amount of field surveying required to adequately position a diver over a given location.

Tom Nugent contacted Bob Taylor of Associated Divers to do the diving. Taylor was highly recommended by Mr. Nugent and was considered as the only person in the Sacramento area capable of the task.

Preliminary field survey work consisted of recovery of horizontal control and setting an additional control point. Time required was one crew day.

The site selected was an area downstream from the Tower Bridge, on the easterly half of the channel, and about 100 feet west of the Delta King. California Coordinates were assigned to the center of the search area for control purposes. California Coordinate System, Zone 2 coordinates of $x=2,140,864$ and $y=332,832$ were used as the target. The search radiated out from this point. This site was selected because research indicates there were many shipping accidents in this general area and artifacts are likely to be found.

JUNE 16, 1986

The personnel working on this assignment were:

Tom Nugent, Consultant
Bob Taylor, Diver
Eric Taylor, Diver's Attendant
Frank Carey, SLC
Ed Zimmerman, SLC
Carlos Najera, SLC

Position for the boat was determined by theodolite and electronic distance measurer. Walkie-talkies were used for communication between boat and shore. A buoy was dropped at the predetermined coordinates without difficulty. The only minor difficulty occurred in anchoring the boat at that location. Total time to locate and anchor the boat was nearly an hour.

Bob Taylor dove alone and spent approximately five hours under water. He found the following:



I. Riverbottom cross-section randomly layered

1. Sand
2. Mud and Silt
3. Baseball sized rocks

II. Diving Conditions

1. Current was considered mild
2. Visibility was limited to 6 to 8 inches
3. Water temperature was not a factor.

The diving day ended at 3:30pm. Ed and Carlos met the boat party at the marina at the end of the day to discuss the day's activities. Taylor recovered three bottles, a drinking glass, and a crock. Only one of the bottles, a hand blown wine bottle, appeared older than twenty years.

The area covered this day was 1400 square feet.

JUNE 17, 1986

The area covered the day before had been plotted on a map. From the coordinated point, most of the coverage had been to the west. This day's coverage would be concentrated to the north and east of the reference point. The activities for the day were very similar to the day before.

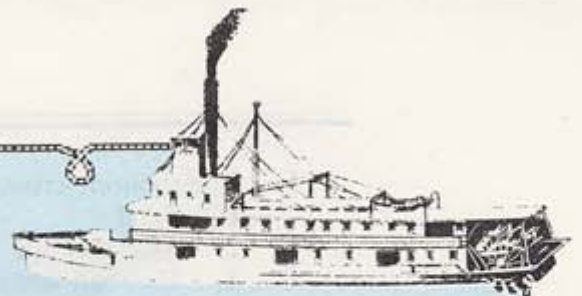
Diving ended at about 4:30 p.m. Taylor recovered a ceramic bowl. He also located rubber tires and hub-caps. An area of 1400 square feet was covered this day.

Summary

An area of approximately 2800 square feet was searched. A cursory examination of the artifacts found indicated that this search area would not yield archaeologically significant artifacts. However, the initial intent of the dive was satisfied. Valuable experience was gained. The area covered in one day is limited. Diving conditions were not very good, but June through September are the best months to dive in the Sacramento River. Visibility is always expected to be minimal, however, the current and water temperature were near optimum. All these factors will be considered in underwater search planning.

Considering limited visibility, a reasonable conclusion is that a "search diving" approach is an inappropriate method of seeking artifacts. Any diving should be limited to investigation of those sites previously identified through reputation or any of the scientific means addressed in this report.





ARRIVAL OF THE YOSEMITE

By the 1860's the appearance of a new steamship on the River was hardly cause for celebration, but as this long newspaper account reveals, Sacramento's citizens still had an abiding fascination for the large glamorous steamers.

The new and magnificent steamer *Yosemite* made her first trip to the city on Saturday night, leaving San Francisco at four o'clock p.m., and arriving at the levee at quarter-past one the next morning. The working of her machinery was entirely satisfactory. Although the tides were unfavorable, the trip was made in eight hours and a quarter. Had the tides been in her favor, she would have arrived by half-past eleven o'clock, or in about seven hours and a half. The *Yosemite* yesterday was visited by hundreds of our citizens, from whom many and profuse expressions of admiration were elicited by the complete appointments and elaborate finish of the boat . . . The main saloon is located on the upper deck, and connected with it are fifty-four state rooms. The main portion of the paneling is painted in white, with appropriate gilt finish. On the panel of each stateroom door is a sketch representing landscape etc in great variety and of elaborate and artistic execution. In addition to these sketches, which were formerly used on the *Eclipse*, there are thirty-six different original sketches in the saloon, of California scenery, painted by Frederick Butman of San Francisco. They of course embrace mountain, river, valley, oceans, etc, and are at once recognized by those who are familiar with the scenery of the state. The ladies' cabin surpasses by far that of any boat on the river for exquisite finish. There are connected with this cabin eight staterooms. The panel work is made entirely of rosewood and satinwood dining-room is capable of accommodating 150 persons at a time, and in connection with it is a fully furnished and faultless culinary department. The male portion of the traveling community will be delighted to find on the boat the best equipped barbershop--movable or stationary--in the state, and the Union men will find that the barber, Charley, is so sound on the Union question as to keep the Union colors, the red, white, and blue permanently displayed before their eyes. The *Yosemite* is, of course, furnished throughout in a style to correspond with her internal finish. She is, in all her apartments, lighted and ventilated far more successfully than vessels of her size and capacity generally are. She will run permanently on the line between this city and San Francisco, alternating with the *Chrysopolis*.



Chapter 4

RESEARCH PROCEDURES

Charge, Activities, Sources and Contacts





ACTIVITIES

Legislative Charge

As part of the 1985/86 budget, the State Lands Commission was requested to locate, document, and investigate the significant ships and artifacts from California's rich historical heritage along the Sacramento River. In general, we were charged with:

- Inventorying, mapping, and cataloging all known points of historical significance along the River, including ports, wharves, piers villages, and ship sinkings.
- Preparing cost estimates for an electronic survey using magnetometers, side-scan sonars, and sub-bottom profilers for the purpose of locating historic ships and artifacts.
- Preparing cost estimates of a program of field verification of selected locations.
- Considering contracting all or part of the study with "outside entities" and shall consider contracting for consulting services with the State Historic Preservation Office.

An exact copy of the authorizing budget item is included in the front of this report. See the table of contents for the page.

Activities

At the onset, staff sent out more than 60 letters. The list included Sacramento City and County elected officials, and Yolo County Officials. Staff hoped to ferret out any caches of information, or to determine if anyone was interested in materially contributing to the report.

All of the major historical societies were contacted, as well as all smaller societies listed in the roster of historical societies. Others notified were John Foster of State Parks, Jim Delgado of National Park Service, Gary Strong, State Library, John Burns, State Archives, James Henley of Sacramento Museum and Historical Commission. The letter explained our project, and asked that if the recipients were "interested in assisting in this project please call.....". Telephone numbers of two Commission staff were listed.



Staff received several written responses to this letter, and those were generally limited to asking to be kept abreast of the work and to obtain a copy of the report. Jim Delgado offered assistance and staff held several discussions with him.

The publicity brought in some inquiries from those who wanted to help as paid consultants. Included among this last list was Roger Kelly, of the National Park Service and Stephen James, from Texas.

Everyone who expressed interest will be sent copies of this report.

As part of our specific budget charge, our Executive Officer sent a special letter of invitation to the State Preservation Office on July 24, 1985, at the very beginning of our work, noting that *We...feel that you and your staff could make a valuable contribution....* The letter requested that *...representative be designated to work with us.* No response was received.

After virtually no indication of interest from the historical - interest groups, we set about meeting the requirements of the budget item.

Staff of the Land Location and Boundary Section were assigned the task of document and map research. They are Boundary Determination Officers who are trained, applied historians, intimately familiar with historical research, and with well developed abilities to tie together various and seemingly unrelated facts using maps, photographs, and documents. Their efforts produced a mass of information which, although not used in this report, remain on file in the offices of the State Lands Commission. All of this material is available to serious researchers and will be kept as a single unit of information in the Land Location and Boundary Section of the State Lands Commission.

They contacted all likely repositories and collected data for evaluation and then perhaps inclusion in the report. Susan Searcy, of the Sacramento History Center turned out to be helpful. While the information the Center has is significant, we either had it already, or it was not useful to us to help meet our specific charges. Susan Searcy gave us some additional sources to contact, but we had already mined those sources.

Outside expertise was retained to prepare two major components of the report. The first required an archaeologist to propose criteria and give an opinion on which sites were not only significant but which would have some potential for recovery or development as Historical Sites. The archaeologist was also asked to provide information on upland historical sites that may have existed such as town, piers, or landings. His views on the value of underwater recovery from ship sinkings were solicited.

Dr. Harold Goldfried, professor at CSUS, was selected to prepare the material. His report, with his own recommendations, is included, in its entirety, in this report as Chapter 1.



The second major component of the charge requiring private expertise was to develop the cost estimates for electronic survey and field verification programs. We needed to know how to verify, as much as possible, the location of potential sites, both above and below water. Recovery operations that will preserve artifacts are very expensive and we needed to be as certain as possible about the costs and problems that might result from our final suggestions.

Staff contacted every firm on the west coast of the United States who advertised the desired equipment for sale. From those few who responded demonstrations of the equipment were arranged. For each demonstration, the equipment was mounted in the State Lands Commission boat and a section of the River near the I Street Bridge was used. To provide a basis for comparison, our boundary officers laid out a surveyed course for all of the demonstrators to use. Representative portions of the printouts are included in the report in Chapter 3. Regrettably the printout is on thermal paper and does not reproduce in the report very well. The entire demonstration results are filed, however, with the project material and are available for inspection.

While we have expertise on upland location procedures, we needed someone to give us information about underwater recovery. To do this, we contracted with Mr. Thomas Nugent, a diver with national recognition, a Captain in the Naval Reserve, and a Senior Project Officer for the US Navy Supervisor of Salvage. He also had experience in historical artifact recovery in different parts of the United States, including work with various public programs in the Old Sacramento Waterfront area. Staff felt that Mr. Nugent would provide a more objective evaluation than may have been possible if someone was used who may possibly have had a vested interest in the outcome. As part of his work for us, several dives into the River adjacent to Old Sacramento were conducted to obtain information that would enable us to make recommendations with more confidence.

Both these contracts, and well as some contracts for clerical and routine research help were carried out under a master agreement with the Hornet Foundation at California State University Sacramento, through the facilities of the Office of University Services, a part of the Chancellor's Office located in Sacramento.





RESEARCH SOURCES AND CONTACTS

In addition to the records of the State Lands Commission the following people and institutions were either consulted, or contributed to the preparation of this report. For each contact, there are detailed research reports on file in the California State Lands Commission. If there is a need, these may be reviewed by contacting Roy Minnick, 916-445-4086, at the Commission's staff office. All of the sources are in California unless otherwise noted.

Arron, Mary M. Memorial Museum
Marysville

Brown, Tony
Rio Vista

California Historical Society
San Francisco

California State Archives
Sacramento

California State Library - California Room
Sacramento

California State University - Chico
Meriam Library

California State University - Sacramento

California Wreck Divers Association
Larry Stein and Bill Wilson
Oxnard

Chapman, Howard
National Park Service

Chico Museum
Chico

Colusa County Library
Colusa

National Park Service



Dooley, Jacquelin
Jensen - Alvarado Ranch Assoc.
Riverside.

Dutra Dredging Co.
Rio Vista

Eckert, Jack
CIGNA Archive Center
Philadelphia, PA. 19103

Federal Archives and Record Center
San Bruno

State Parks and Recreation
Sacramento

Haggin Museum
Stockton

Harrison, Warner
Marysville

**Holt-Atherton Center for
Western Historical Studies**
University of Pacific
Stockton

Hunter, Jack
Marine Archaeologist
San Pedro

James, Steve
Nautical Archaeologist
Espey, Huston & Assoc.
Austin, Tx.

Kortum, Karl
National Maritime Museum

Lauritzen, Roland
Stockton

Randall De Mattei
The Mobius Society
Los Angeles



Marysville Public Library
Marysville

McCotter, Gary
Independent diver

Moore's Riverboat
Isleton

Morris, Don
Santa Barbara

National Archives
San Bruno

National Maritime Library
San Francisco

Oakland Museum
History Research Center
Oakland

Older, Mary Shafer
Lucerne

Olmstead, Nancy
Consultant

Pierson, Larry J.
P. S. Associates
Cardiff

Rio Vista Museum
Rio Vista

Sacramento Bee

Sacramento Corral of the Westerners

Sacramento County Historical Society
Sacramento Museum and Historical Commission
Sacramento

Sacramento History Center
Sacramento

Sacramento Valley Museum Association
Williams



Sacramento Union

San Joaquin County Historical Society
and Museum
Lodi

Sands, Anne
Riparian Systems
Mill Valley

Sausalito Historical Society
Sausalito

State Historical Preservation Office

Stockton Central Library
Stockton

United States Army - Corps of Engineers
Sacramento

University of California - Berkeley
Bancroft Library

University of California - Berkeley
Franklin Doe Library

University of California - Berkeley
Law Library - Boalt Hall

University of the Pacific
Holt-Atherton Center for Western Historical Studies
Stockton

Water Resources, California Department of
Sacramento

White, Les
Wood dating expert

Yolo County Historical Society
Woodland

Yolo County Library
Woodland

Yuba County Library
Marysville

Chapter 5

REFERENCES

Books, Documents, Maps





MAP REFERENCE LIST

The following maps were consulted during the preparation of this report.

- (no date) *Map of a part of the Sacramento River.* Source: Unknown. Listed as number 47 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineers, U. S. Archives. Scale: Undetermined.
- (no date) *Sacramento and San Joaquin Drainage District, Solano and Sacramento Counties.* Rancho de los Ulpinos and subdivision thereof and record ownership thereof. Source: Sacramento and San Joaquin Drainage District, SLC Map No. CXA 56. Scale: 1 inch = 400 feet.
- (1849) *The Sacramento Valley from the American River to Butte Creek, by order of Gen. Riley, comdg 10 Mil. Dept.* Author: Lieut. Geo. H. Derby. Source: Unknown. Listed as W 10 Roll on page 1 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineers, U. S. Archives. Scale: Undetermined.
- (1870) *Map of the Sacramento River between Rio Vista and the foot of Steamboat Slough containing the obstruction to navigation known as the Hog's Back; made by Lieut. W. H. Heuer, assisted by Chas. F. Brown.* Author: Maj. R. S. Williamson. Source: Unknown. Listed as W 141 Roll on page 7 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineers, U. S. Archives. Scale: 400 ft. to 1 inch.
- (1870) *Map of the Sacramento River between Sacramento and Heacock's Shoal; made by Lieut. W. H. Heuer, assisted by Chas. F. Brown.* Author: Maj. R. S. Williamson. Source: Unknown. Listed as W 140 Roll on page 8 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineers, U. S. Archives. Scale: 400 ft. = 1 inch.



- (1874) *Map of country N. of Suisun Bay and W. of Sacramento River, Cal.* Author: Unknown. Source: Maj. R. S. Williamson. Listed as U. S. 324 Portfolio No. 126 on page 25 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineers, U. S. Archives. Scale: Undetermined.
- (1874) *Map of the country east of the Sacramento (Eldorado, Placer & Sacramento counties) Cal., showing tributaries of the Sacramento & Feather rivers.* Author: Unknown. Source: Maj. R. S. Williamson. Listed as U.S. 324 Portfolio No. 64 on page 27 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief Engineers, U. S. Archives. Scale: Undetermined.
- (1877) *Georgiana Slough, Cal; sketch showing its relation to main channel of the Delta of the Sacramento and San Joaquin rivers, accompanying report of examination by H. H. Payson submitted with letter of June 19, 1877.* Author: Maj. G. H. Wendell. Source: Unknown. Listed as U. S. 430 Portfolio, No. 219 on page 11 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineers, U. S. Archives. Scale: 1 inch to one half mile.
- (1880) *Map of the lower portion of the Sacramento River, Cal. showing the tributary streams draining Hydraulic Mining Districts.* Author: Lieut. Col. G. H. Wendell. Source: Unknown. Listed as W 318 Roll on page 15 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineers, U. S. Archives. Scale: 1 inch = 12 miles.
- (1880) *Upper Sacramento River, Cal; drawings accompanying letter of April 23, 1880, viz.: Sketches of the principle obstructions - Sam Soule's Bar, Munroe's Bar and Dead Man's Bar - showing proposed improvements, and Sketch of Tehama Rapids, from surveys by L. H. Le Conte, Asst. Engr., Nov. 1879; General plan of proposed wing dams at Munroe's Bar to Deadman's Bars, and at Sam Soule's Bar.* Source: Unknown. Author: Lt. Col. G. H. Wendell. Listed as W 327 on page 16 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineer U. S. Archives. Scale: 1: 7,200.
- (1881) *Protection of the navigable waters of California from injury from the debris of mines: maps accompanying report of Jan. 10, 1881, viz.: Lower portions of the Sacramento and San Joaquin rivers, showing*



tributary streams draining hydraulic mining districts. Author: Lt. Col. G. H. Wendell. Source: Published in Annual Report, Chief of Engrs. 1881. Listed as W 347 Roll on page 16 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineers, U. S. Archives. Scale: 1 : 760,320.

(1886) *Sacramento River from the mouth of the American River to below Sacramento City; comparative cross sections of: from surveys of 1854, 1878 and 1885, annual report June 30, 1886.* Author: Capt. A. H. Payson. Source: Unknown. Listed as W 443 Flat on page 35 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineers, U. S. Archives. Scale: Undetermined.

(1888) *Map showing the present condition of river & harbor work and the newly dredged channels in California, in charge of Maj. W. H. Heuer. Submitted for the files of the O. C. of E., in compliance with the order dated Nov. 23, 1887, with maps of the following localities, viz.: Walsh's Cut-off, Sacramento R.; Farratts Chute, do., & Calls Bend, do., Cala, respectively. Scale: 500 feet : 1" (1: 6000). Mouth of Feather R. Cal., three dams built at, 1885. Scale: 200 feet : 1"; Sacramento R., three dams built in 1879 - 81 - 85. Scale: 300' : 1" (Eremoni Bar). Sacramento R., two dams built in 1885. Scale 200' : 1" (at Sacramento).* Author: Unknown. Source: Unknown. Listed as W 469 Flat on page 18 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineers, U. S. Archives.

(1889) *Sacramento River, Cal., near Payne's Crevasse; Map of survey of, relating to the project & estimate for repair of damage by floods.* Author: Major W. H. Heuer. Source: Col. G. H. Wendell. Listed as W 522 Flat on page 18 in "Catalogue of Maps sent to the Engineer's Office at Washington". The catalogue is part of Records Group 77, Records of the Office of the Chief of Engineers, U. S. Archives. Scale: Undetermined.

(1908) *San Joaquin River from Stockton to Suisun Bay at Collinsville. Sacramento River, Sacramento and Contra Costa Counties.* Source: Corps of Engineers, Sacto. SLC Map No. CXA 42. Date of Survey: 1908. Scale: Graphical.

(1924) *From the mouth of Cache Slough to Collinsville. U.S.E.D. Coordinated, ticks shown property on both sides of river Sacramento and Solano Counties.* Source: U.S.E.D. SLC Map No. CXA 1185. Date of Survey: August 25, 1924. Scale: 1 inch = 1200 feet.



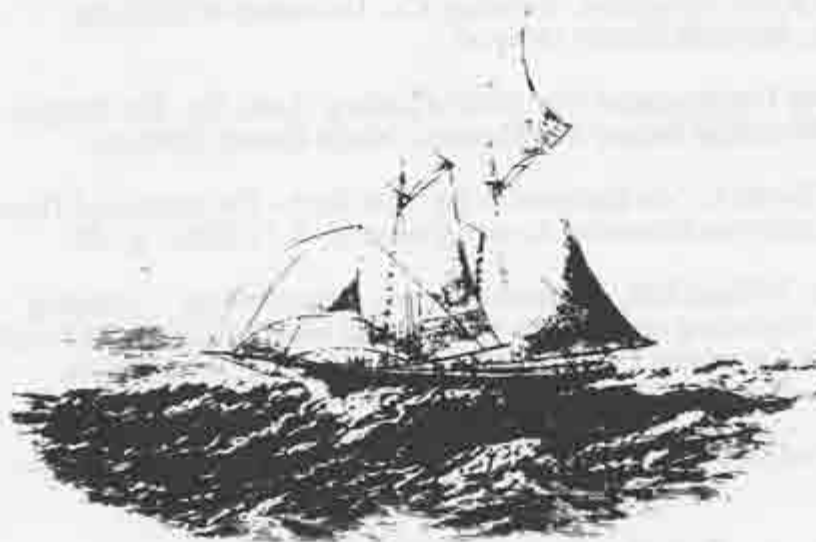
- (1933) *Sacramento River Basin from Sacramento to Collinsville.* Sacramento River, Solano, Sacramento, and Yolo Counties. Source: Corps of Engineers, Sacto. SLC Map No. CXA 374. Date of Survey: Jan., 1933. Scale: 1 inch = 400 feet.
- (1934) *U. S. Coast and Geodetic Survey, Hydrographic Survey No. 6006, on T 5001: Georgiana Slough, Sacramento River, California.* Date of Photographs: December 15, 1931. Date of Survey: February, March, April 1934. Scale: 1 : 10,000.
- (1934) *U. S. Coast and Geodetic Survey, Hydrographic Survey No. 6009, on T 5002: North Fork of Mokelumne River and Georgiana Slough, Sacramento River, California.* Date of Survey: March 1934. Scale: 1 : 10,000.
- (1934) *U. S. Coast and Geodetic Survey, Hydrographic Survey No. 6013, on T 5000: Decker Island, Lower Sacramento River, California.* Date of Survey: July 1934. Scale: 1 : 10,000.
- (1935) *Cache and Lindsey Slough Junction, Sacramento River, Solano Counties.* Sacramento River, California, Cache and Lindsey Sloughs. Source: Corps of Engineers. SLC Map No. CXA 59. Date of Survey: June 1935. Scale: 1 inch = 400 feet and graphical.
- (1937) *From Colusa to Chico Landing. Mile 142 to Mile 194, Sacramento River, Glenn, Butte and Colusa Counties.* Source: U.S. Corps of Engineers. SLC Map No. CXA 1263 through 1281. Date of Survey: March 1937. Scale: 1 inch = 400 feet.
- (1938) *Knights Landing Sacramento River. (Yolo Co.) through Colusa (Colusa Co.) Sutter, Yolo & Colusa Counties.* Source: U.S. Engineers. SLC Map No. CXA 1190 through 1205. Date of Survey: August 1938. Scale: 1 inch = 400 feet.
- (1940) *Cache Slough (Mouth), Sacramento River, Solano and Sacramento Counties.* Sacramento River, California 1940 River Survey, mouth of Cache Slough to Collinsville. SLC Map No. CXA 58. Date of Survey: 1940. Scale: Graphical.
- (1942) *Boundaries and Transportation Map, Tehama County.* Shows highways, railroads, canals, air lanes, and dredged channels. Source: Fed. Works Agency. SLC Map No. CXA 596. Date of Survey: 1942. Scale: 1 : 250,000.
- (1942) *Sacramento River, Sacramento County.* Proposed 12 3/4 inch O. D. gas main crossing, under Sacramento River. Source: Undetermined. SLC Map No. CXA 985. Date of Survey: April 1942. Scale: Horizontal: 1 inch = 40 feet, Vertical: 1 inch = 4 feet.



- (1949) *Rio Vista, City of, Sacramento River, Solano County. Survey of City Property on the Sacramento River between Logan Street and State Highway* Author: Walter B. Berger. Source: Solano Engineers Associated. Date of Survey: March 3, 1949. Scale: 1 inch = 50 feet.
- (1949) *Sacramento River from Walnut Grove to Isleton. Property ownerships Georgiana Slough. Sacramento River, Sacramento County.* Source: California Reclamation Board. SLC Map No. CXA 1186. Date of Survey: March 1949. Scale: 1 inch = 1,000 feet.
- (1952) *Sacramento River, Sacramento and Contra Costa Counties.* Source: State Lands Commission. SLC Map No. CB 550. Date of Survey: 1952. Scale: 1 inch = 50 feet.
- (1953) *Sacramento River, Yolo and Sacramento Counties.* Source: State Lands Commission. SLC Map No. CB 531. Date of Survey: Nov. 1953. Scale: 1 inch = 50 feet.
- (1953) *T11 & 12N, R3E. Gas lease from Sacramento and San Joaquin Drainage Dist. to Humble Oil and Gas Co., vicinity of Fremont Wier.* Source: The Reclamation Board. SLC Map No. CXA 1189. Date of Survey: Feb. 1953. Scale: 1 inch = 400 feet.
- (1953) *Ordinary High Water Mark, Sacramento River Yolo and Sacramento Counties.* Source: State Lands Commission. SLC Map No. CB 584-595. Date of Survey: Sept. 1953. Scale: 1 inch = 100 feet.
- (1954) *Ordinary High Water Mark, Sacramento River. Broderick and Sacramento.* Source: State Lands Commission. SLC Map No. CA 81 thru 84. Date of Survey: Feb. 1954. Scale: 1 inch = 100 feet.
- (1957) *Mean High Tide Line & Profiles, Sacramento River, Sacramento County.* Source: State Lands Commission. SLC Map No. CB 806. Date of Survey: November 1957. Scale: 1 inch = 200 feet.
- (1959) *State's Claim to Bed of Sacramento River, Vicinity of Hartley's Island, Butte and Glenn Counties.* Source: State Lands Commission. SLC Map No. CA 92. Date of Survey: April 1959. Scale: 1 inch = 400 feet.
- (1959) *Rancho Llano Seco, Sacramento River, Glenn and Butte Counties.* Source: State Lands Commission. SLC Map No. CB 886-87. Date of Survey: May 1959. Scale: 1 inch = 2,000 feet.



- (1959) *Rancho Llano Seco, Parrott Claim, Glenn County*. Source: State Lands Commission. SLC Map No. CB 1488. Date of Survey: May 1959. Scale: 1 inch = 2,000 feet.
- (1959) *Rancho Llano Seco, Sacramento River, Glenn County*. Source: State Lands Commission. SLC Map No. CB 1489. Date of Survey: August 1959. Scale: 1 inch = 24,000.
- (1961) *Quiet Title No. 10953, Sacramento River, Glenn and Butte Counties, California Properties of George F. Peterson, Harry E. Nichols & Charles M. Collier, et al.* Source: State Lands Commission. SLC Map No. CB 1158. Date of Survey: June 1961. Scale: 1 inch = 2,000 feet.
- (1961) *North Properties of P.G.E., Sacramento River, Contra Costa County*. Source: State Lands Commission. SLC Map No. CB 1161. Date of Survey: April. Scale: 1 inch = 200 feet.
- (1968) *Bloody Island, Macco Realty, Sacramento River, Tehama County*. Plotting of Government Field Notes. Overlay for Bend and Balls Ferry Quadrangle. Source: State Lands Commission. SLC Map No. CB 1496 and 1497. Date of Survey: August 1968. Scale: 1 : 24000.





BIBLIOGRAPHY

The Following books were consulted during the preparation of this report:

Alta California. (San Francisco). 1849-1880.

American Congress on Surveying and Mapping. *An Overview of Hydrographic Surveying.* American Congress on Surveying and Mapping, Committee on Marine Surveying and Mapping.

Ballard, Robert D. *A Long Last Look at TITANIC.* *National Geographic.* Vol. 170 - No. 6 Dec. 1986.

Bancroft, H.H. *Chronicle of the Builders of the Commonwealth.* San Francisco: The History Company. 1892.

Bancroft, H.H. *History of California.* Vol. I, IV, VI, VII, XXI, XXIV. San Francisco: A.L. Bancroft, Pub. 1886.

Berman, Bruce D. *Encyclopedia of American Shipwrecks.* Boston. Mariners Press, Inc. 1972.

Briggs, Asa. *The Power of Steam an Illustrated History of the World's Steam Age.* Chicago. University of Chicago Press. 1982.

California Steam Navigation Company. Misc. Papers 1858-1869, History, Bay and River Navigation. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

California Transportation Co. Bills of Lading. Lodi, Ca. San Joaquin County Historical Society and Museum (Micke Grove) (Source).

Camp, Charles L. "An Irishman in the Gold Rush--The Journal of Thomas Kerr." *California Historical Society Quarterly.* 8.1 (1929): 17-25.

Coleman, William Tell. Business ventures in Sacramento - - shipping interests (including associations with Edward Mott Robinson and People's California Steamship Co.) Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

Cook, Fred S. *Steamboats in the Valley.* Stockton, Ca. Stockton City Library.

Daily Morning Call. (San Francisco). 1856-1880.

Dana, Julian. *The Sacramento River of Gold.* New York: Farrar and Thinehart. 1939.



Desmond, Charles. *Wooden Ship-Building*. Reprint. Originally published: New York: Rudder Pub. Co., c.1919. Vestal, New York: Vestal Press Ltd. 1984.

Dickenson, A.B. *Van Pelt's "Sacramento"*.

---. *1849 River Boats*.

Dillon, Richard. *Fool's Gold: The Decline and Fall of Captain John Sutter of California*. New York: Coward-McCann. 1967.

Drago, Harry Sinclair. *The Steamboaters: From the Early Side-wheelers to the Big Packets*. New York: Dodd, Mead. 1967.

Dyke, Dorothy Jeanette. "Transportation in the Sacramento Valley, 1849-60." Diss. University of California. 1922.

Espey, Huston & Associates, Inc. *Spatial Limits of Two Historic Shipwrecks: J Street Area, Sacramento California*. Austin, Tx. Espey, Huston & Associates, Inc.

Fay Brothers. *Correspondence 1852 - 1854*. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

Foster John W. *An Assessment and Treatment of Impacts to Historic Shipwrecks in the Sacramento River*. John W. Foster, Foothill Archaeological Services, Fair Oaks, Ca. 1985.

Gibbs, James A. *Shipwrecks of the Pacific Coast*. Portland: Binford and Mort Pub. 1962.

---. *Disaster Log of Ships*. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

Giles, Rosena A. *Shasta County, California, A History by Rosena A. Giles*. Oakland, Ca. Biobooks. 1949.

Green, Will S. *The History of Colusa County, California and General History of the State*. Sacramento, Ca. Sacramento Lithograph Co. 1950.

Hancocks, Robert Jr. No Title. *Golden Notes*. 9.3 (1963): 2-20.

Helper, Anton. *Land of Gold*. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

Heaser, Eileen. *Sacramento River and Delta Area*. Chico, Ca. California State University, Chico, Meriam Library (Source).



Historical Evaluation of Delta Waterways. Report No. 3. Prepared for the State Lands Commission.

Historical Record Co. *History of Colusa and Glenn Counties*. Los Angeles: Historical Record Co. 1918.

Hitchcock, Ruth Hughes. *Leaves of the Past 1828 - 1880, A Pioneer Register, Including an Overview of the History and Events of Early Tehama County*. Chico, Ca. Association for Northern California Records and Research.

Hoffman, H. Wilbur. *History of Navigation on California's Feather River*. Diss. Sacramento State College, 1963.

Howland, S. *Steamboat Disasters and Railroad Accidents in the United States*. 1846. San Francisco. National Maritime Library (Source).

Hunter Underwater Archaeology. *Old Sacramento Waterfront Underwater Archaeological Survey*. Submitted to the Sacramento Housing and Redevelopment Agency. October, 1984.

Hurd, Edith Thatcher. *Sailers, Whalers and Steamers, Ships that Opened the West*. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

Hutchings. *Steamboats That Have from Time to Time Been Running from San Francisco to Sacramento*. 4: 1-15, July, 1859. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

Hutchinson, W.H. *California: Two Centuries of Man, Land, and Growth in the Golden State*. Palo Alto: American West Publishing Co. 1969.

Ing, John C. "The Sacramento Valley." *The Raven* (Sacramento Valley Edition.) 6:3 1905: 135-42.

Kemble, John Haskell. "The First Steam Vessel to Navigate San Francisco Bay." *California Historical Society Quarterly*. 14.2 (June): 135-42.

Kemp, Peter. *The Oxford Companion to Ships & the Sea*.

Koch, Gerald (Doner). *Book of Collections - Papers of 1848, 1850 - 55, 1858, 1866*. San Francisco, Ca. National Maritime Library (Source).

Lee, Daniel. *The Steamboat - Catalytic Element in the Development of Red Bluff, California 1850 - 1862*. Chico, Ca. University of California, Chico, Meriam Library (Source).



Lindsay Publishing. *Catalogue 1884, Porter Mfg. Co., Limited, Engines and Boilers*. Lost Technology Series. Printed 1884 by Truair, Smith & Bruce, Syracuse, New York. Bradley, Il. Lindsay Pub. 1985.

---. *Mechanic's Notebook 13*. Bradley, Il. Lindsay Pub. 1985.

---. *Steam Boilers*. Reprinted from: *Steam Boilers*, W.M. Barr, 1880. Bradley, Il. Lindsay Pub. 1982.

---. *Steam Engine Design*. Lost Technology Series. First published in 1896 by International Correspondence Schools. Bradley, Il. Lindsay Pub. 1983.

Lyman, John. *The Sailing Vessels of the Pacific Coast and Their Builders, 1850 - 1905*. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

MacMullen, Jerry. *Paddle-Wheel Days in California*. Stockton, Ca. Stockton City Library (Source).

Major Shipwrecks on the Coastal, Offshore and Inlands Waters of the Pacific Coast, Washington, Oregon and California (circa 1550 - 1962). California Historical Society, San Francisco, Ca. (Source).

Marine Engineer's Beneficial Association. No. 35. List of Steamers Wrecked on the Pacific Coast 1850 - 1894. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

Marshall, Don B. *California Shipwrecks: Footsteps in the Sea*. Seattle: Superior Publishing Co. 1978.

Matteson and Williamson Mfg. Co. Bills of Lading. Lodi, Ca. San Joaquin County Historical Society and Museum (Micke Grove) (Source).

Matthews, F.C. "Gold Rush Vessels." *Pacific Marine Review*. August, 1922.

McCormick, Charles D. *History of Colusa and Glenn Counties*. Los Angeles. Historic Record Co. 1918.

McGowan, Joseph. "A River Palace on the Sacramento." *Golden Notes*. 22.2 (1976): 1-14.

---. *History of the Sacramento Valley*. Three volumes. New York: Lewis Historical Publishing Co., 1961.

---, and Terry Willis. *Sacramento -- Heart of the Golden State*. Woodland Hills, CA.: Windsor Publishing. 1983.



---, *San Francisco -- Sacramento Shipping, 1839-1854*. Diss. University of California, 1939.

---, *The Sacramento Valley: A Student's Guide to Localized History*. New York: Columbia Press, 1967.

McKinstry, George. "Documents for the History of California, 1846-49." ms. University of California.

McMullen, Jerry. *Paddlewheel Days in California*. Palo Alto: Stanford University Press, 1944.

Mills, Frank R. and Ev Mills. "Rail and Water." *History West*. North Highlands, Ca. Frank R. Mills and Ev Mills, 1981.

Mims, Julie Elizabeth and Kevin Michael Mims. *Sacramento: A Pictorial History of California's Capital*. Virginia Beach, Virginia: The Donning Co. Pub. 1981.

National Register of Historic Places. 1976. Sacramento, Ca. California State Library, Government Publications Section (Source).

Neasham, V. Aubrey, and James E. Henley. *City of the Plain: Sacramento in the Nineteenth Century*. Sacramento Pioneer Foundation in Cooperation with Sacramento Historic Landmarks Co. 1969.

Ostrander, Daniel Lee. "The Steamboat: Catalytic Element in the Development of Red Bluff, California, 1850-62." Diss. Chico State College, 1968.

Perkins, George Clement. Early life as seaman including shipping business, etc. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

Sacramento Bee. 1857-1880.

Sacramento Steamer Union. May 1, 1852 - Sept. 15, 1854.

Sacramento Transcript. April 1, 1850 - June 16, 1851.

Sacramento Union. March 19, 1851 - 1880.

Scott, Hon. Charles L. of California. On the Steamboat Passenger Bill. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

Severson, Thor. *Sacramento: An Illustrated History - 1839-74*. San Francisco. California Historical Society. 1973.



Shaw, George. *A History of Steamboating on the Upper Sacramento, 1850-1862*. Chico, Ca. University of California, Chico, Meriam Library (Source).

South, Arethusia Aurelia. "*California Inland Navigation, 1839-1890*." diss. University of California. 1939.

Southern Pacific Co. Bills of Lading. Lodi, Ca. San Joaquin County Historical Society and Museum (Mickey Grove) (Source).

Spangler, H.W., Arthur M. Greene, Jr., S.M. Marshall. *Elements of Steam Engineering*. Lost Technology Series. Original copyright 1903 by Spangler, Greene & Marshall, and published by John Wiley & Sons, New York. Bradley, Il. Lindsay Pub. 1984.

Stockton, City of. *Charter and Ordinances of the City of Stockton*. Stockton, Ca. Independent Book and Job Printing Establishment. 1870.

---. *Charter (As Amended) and General Ordinances of the City of Stockton*. Stockton, Ca. The Daily Evening Mail Steam Presses. 1882.

---. *Revised Ordinances of The City of Stockton*. Stockton, Ca. Silliam Biven, City Printer. 1855.

Stockton, City of, Mayor of. *Annual Report of the Mayor of the City of Stockton, California*. Stockton, Ca. Daily Evening Herald Book and Job Printing Office. 1881.

Surveyor's and Engineer's Reports for 1861 - 1869. Lodi, Ca. San Joaquin County Historical Society and Museum (Mickey Grove) (Source).

Thompson. *Settlement Geography of the Sacramento - San Joaquin Delta, California*. 1957.

Thompson, John. "The Ferry System of the Lower Sacramento River." *The Pacific Historian*. Vol. 25, No. 1, Spring, 1981. Stockton, Ca. University of the Pacific.

Thompson and West. *History of Sacramento County, California*. Berkeley, Ca. Howell - North. 1960.

Early Navigation. *Union Oil Bulletin*. May, 1938. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

United States. Congress. Senate. *Senate Executive Documents*. Report on the Steamboat Act. 34th Congress. 1st session, Washington: GPO. 1856.



Wagon Wheels. Vol. XII, No. 1, August, 1963, Colusa, Ca. Colusa County Library (Source).

Waterland, John, "John Waterland's Historical Articles." Photocopied from the Chico Record.

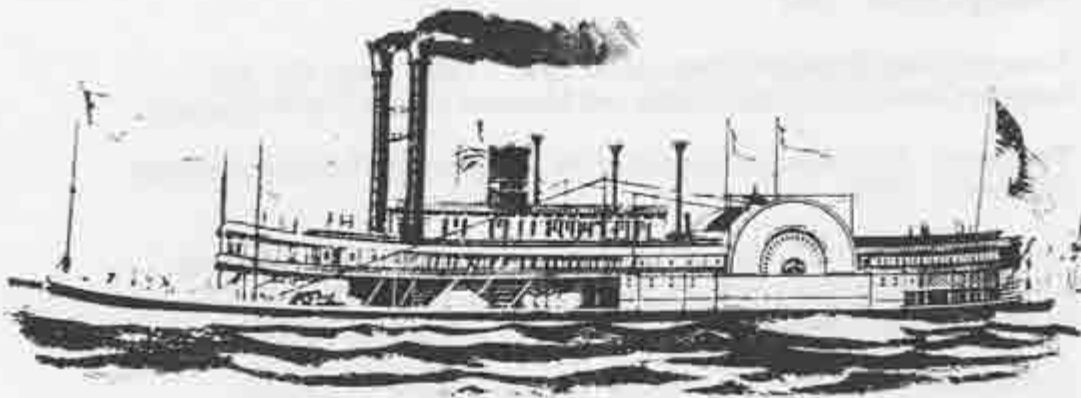
Wiltsee, Earnest. *Gold Rush Steamers of the Pacific*.

Wheelwright, William. *Early Plans and Projects for Pacific Steam Navigation*. Berkeley, Ca. University of California, Berkeley, Bancroft Library (Source).

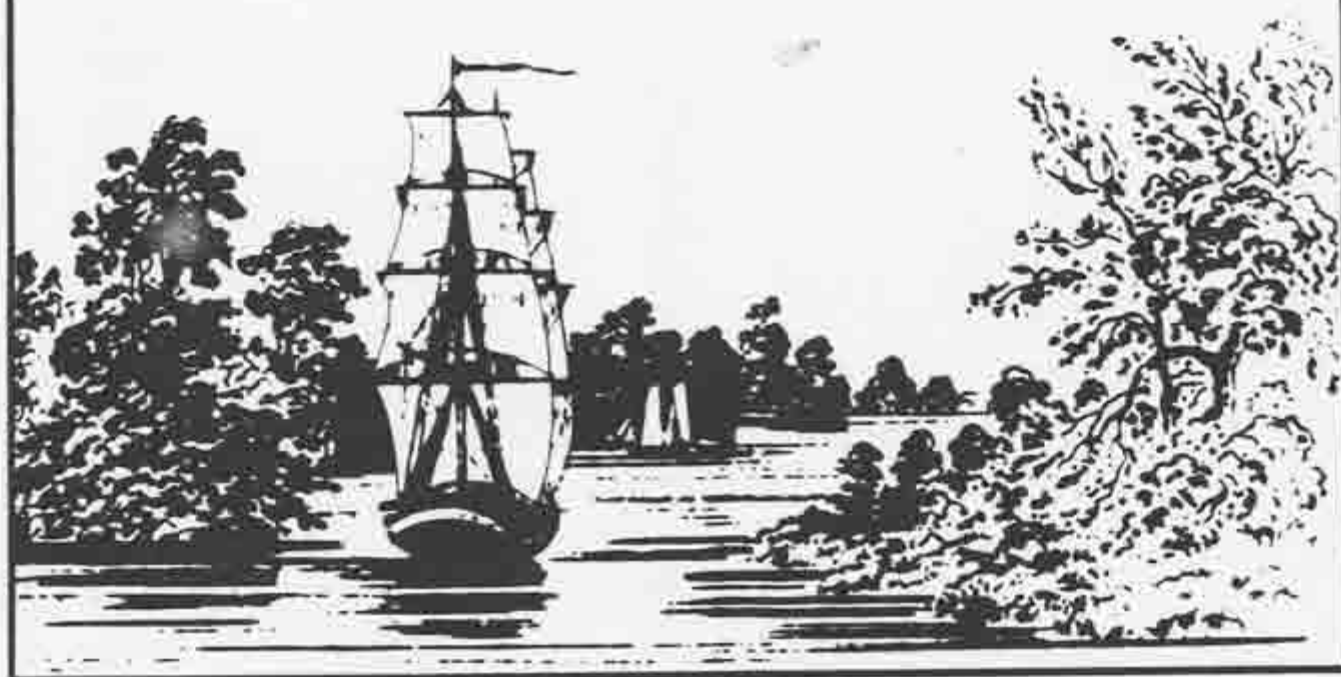
Whittier, Bob. *Paddle Wheel Steamers and Their Giant Engines*. Duxbury, Mass. Seamaster Boats, Inc. 1983.

Wooldridge, Major J.W. *History of the Sacramento Valley California*. Three volumes, Chicago: The Pioneer Historical Publishing Co. 1931.

Zelinsky, Edward Galland, and Nancy Olmstead. "Upriver Boats - When Red Bluff Was the Head of Navigation." *California History*. 64.2 (1985): 86-117.



ACKNOWLEDGMENTS
PHOTO CREDITS





ACKNOWLEDGEMENTS

Some persons outside the Land Location and Boundary Staff were particularly helpful in furthering this project.

Dave Brown, Georgia Steffano, Gary Fuji, and others in the Accounting Section of the State Lands Commission expedited our requests for equipment and services. Without their help, there the elaborate procedures of government would have prolonged the report by at least a year.

Joyce Lane, in Land Management Section, was very helpful in connecting us with divers needed for the exploratory dives.

Bill Morrison continually provided support and encouragement, kept the interested members of the legislature informed, and handled many difficult press contacts.

Walter Harvey, owner of the Delta King, permitted us to board the boat while we were doing our exploratory dives.

Dr. Gene Antone, Deputy State University Dean, and others in his Office of University Services, California State University, were helpful in providing us with access to the University experts and students.

A list of those who were a hindrance is available upon request to Roy Minnick, at the office of the State Lands Commission staff.





PHOTO CREDITS

Note: State Library refers to California State Library; HT refers to Houseworth Collection in the library. SLC refers to California State Lands Commission. CSUC refers to Calif. State Univ. at Chico.

	PAGE
Figure 1 State Library, Stereo Collection, HT., #1075	25
Figure 2 State Library, Stereo Collection, Johnson, N. N., #7754	26
Figure 3 State Library, Stereo Collection, H T., #1063	29
Figure 4 State Library, Stereo Collection, Lawrence & Houseworth, N. N.	31
Figure 5 Graphic Enhancement, original courtesy of State Library	32
Figure 6 Graphic Enhancement, original, courtesy of State Library	33
Figure 7 Graphic Enhancement, original courtesy of State Library	34
Figure 8 Graphic Enhancement, original courtesy of State Library	35
Figure 9 Special Collections, Meriam Library, CSUC.	38
Figure 10 Special Collections, Meriam Library, CSUC.	41
Figure 11 Sacramento Public Library	42
Figure 12 SLC, Russell Collection	43
Figure 13 Clip Board Art - Unknown Source	44
Figure 14 State Library, Stereo Collection, HT., #1207	118
Figure 28 From a negative in the SLC Files.	190
Figure 29 From a negative in the SLC Files.	190
Figure 30 From a negative in the SLC Files.	194
Figure 31 From a negative in the SLC Files.	194
Back Cover From a negative in the SLC Files.	

APPENDIX

A Historical Reprise





A HISTORICAL REPRISE

The following information was collected as part of the investigation. While it has no particular bearing on the charge given to the State Lands Commission, it is an interesting sidelight, and we pass it on without comment.

Exploration

Spanish Captain Moraga named the Sacramento River "Jesus Maria," and gave one of its tributaries the name *Sacramento*. The names were eventually switched.

Other explorers included a Russian named Kotzebue who in 1816 or 1818 went as far as Sacramento.

Settlement

Ceremonial Captain John Sutter went to Monterey to talk to the Mexican Governor about colonizing parts of the upper Sacramento. The Mexican Government's land policies were very liberal. He was given the right to explore and occupy this country on the condition that he become a Mexican citizen. He organized his expedition at Yerba Buena, now San Francisco.

And on August 9, 1839, he sailed up the Sacramento River in two ships, a schooner, *Isabel* and a yacht, *Nicholas*. He landed at the foot of what is now 28th Street.

Sutter's Fort was begun in 1839 and finished in 1841. He called it New Helvetia. The Fort has been reconstructed and remains a tourist attraction in Sacramento.

The fort was the stopping place for miners going to the gold fields. By July 1848, 10-12 stores operated in the fort itself where the merchants paid \$100 a month rent for a single room.

In March 1849, in the midst of gold fever, Sutter's launch was charging \$100 - \$200 per person for passage to Sutter's Fort from San Francisco and was carrying a full load each trip. After 1845 a ship either arrived or left the embarcadero at Sacramento at least every two weeks.

Sutter raised wheat, corn, horses and cattle--he also had a income from the salmon fisheries.

In his manner, Captain Sutter is frank and prepossessing; he has much intelligence, is conversant with several languages, and withal not a little enthusiastic; he generally wears a kind of undress uniform with his sidearm buckled around him. *Wooldridge, p. 22.*



John Augustus Sutter, Jr., eldest son of Sutter arrived at the fort in September 1848 to help his father out of debt. By August 1848 John Sutter's debt was estimated \$100,000 † (McGowan, *Hist. of Sac. Valley*, Chap. 4.

Gold Rush and Statehood

Sacramento grew by leaps and bounds after May 1849 when the first of the forty-niners began to arrive by ship (which was a three-month trip from the East Coast around Cape Horn to the West Coast). Not a single building was on the site of Sacramento in November 1848; by mid-1849, Sacramento was a booming frontier town, with a booming economy as well. Prices in Sacramento were in some cases 20% higher than in San Francisco.

Sacramento City was surveyed two miles west of the fort. In 1844, Suttersville was established as the intended city. However, the activity centered around Sacramento and Sutters Fort. Finally the level of business activity exceeded to capacity of the Fort, and Sacramento received its city charter on February 27, 1850.

A great city in the making, hastily thrown together, its parts unrelated, its fortunes trembling on the precarious ground of overstimulation of land values, its population on the verge of departing to the mines, always in quest of the riches of its dreams. —*Wooldridge p. 39.*

Growing Sacramento

The squatters' riots bared a Sacramento where the old and the new ways clashed head on. Those who had bought land from Sutter now were being confronted by newcomers, some of them avowed anarchists who questioned the validity of Sutter's claim, saying that the Mexican Cession invalidated those claims, and argued that every man was entitled to a city lot. Things came to a head with an eruption in August, 1850. The leader of the squatters was shot dead, and Mayor Hardin Bigelow was seriously wounded.

The issue was never raised again.

As Sacramento grew in importance and population, so did the need to protect itself from flooding. Mayor Bigelow pushed for higher and higher levees.

Sacramento was named by Congress as a port of entry in September 1850. This helped speed up the delivery of goods and lessened the

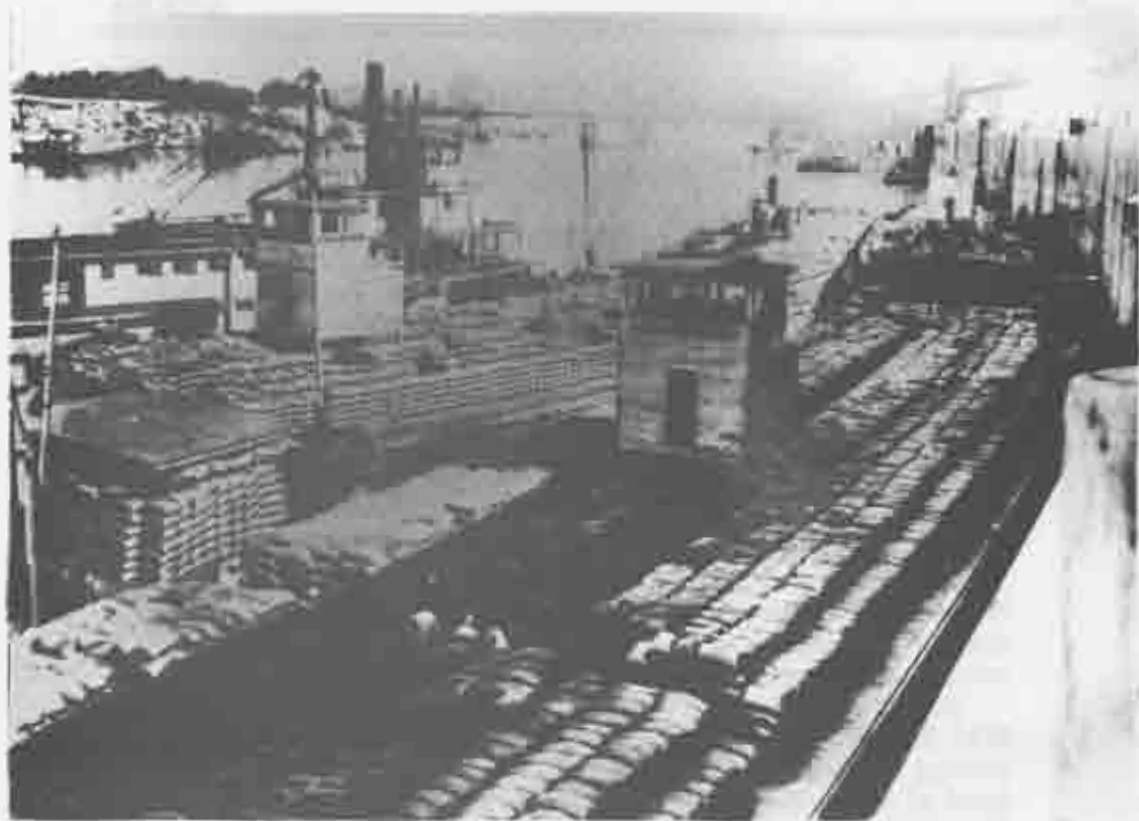


Figure 28. The Sacramento riverboat in the late 19th Century.

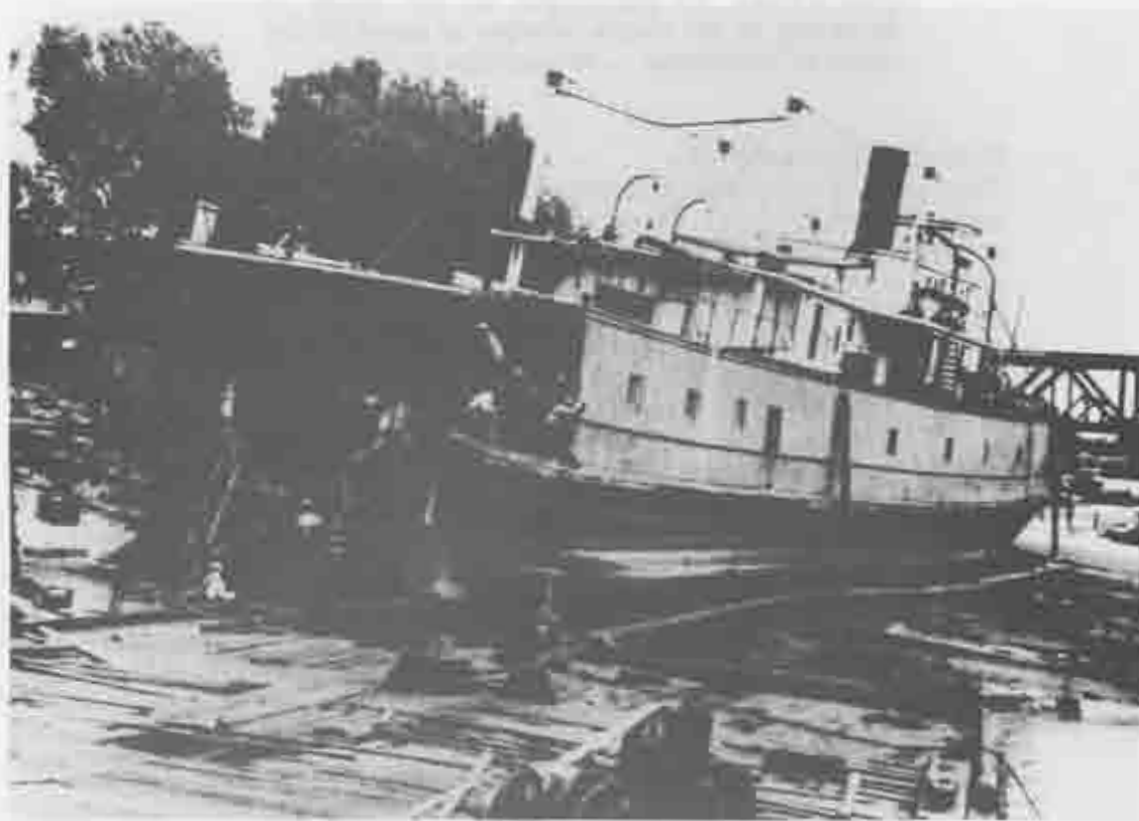


Figure 29. Riverboat repair on the Sacramento "I" Street bridge in background.



cost of freight, since in 1850 over half of California's population was dependent on Sacramento for supplies. But wooden ships were being replaced by iron ships which could not turn around at Sacramento. Sacramento lost this status in 1852.

—McGowan, *History of Sacramento Valley*
Ch. 6.

After 1852 the tonnage of supplies dropped, population dropped and the amount of placer gold diminished as well.

Sacramento built bridges to handle its extra traffic. It had two bridges crossing the American in the early years, plus another built in 1857 at the foot of I Street.

Some apprehension was felt in Sacramento when a sandbar in front of the Embarcadero began growing at an alarming rate:

Captain Bill Corlett, substitute master of the *Goodman Castle*, made short work of the bar by tying half a dozen iron plows together, dropping them overboard, and dragging them up and down the waterfront on a hawser, chewing up the bar and leaving it to the current to carry the debris downriver to lodge somewhere else.

—*The Steamboaters* p. 224.

Gold was discovered by James Marshall, foreman at Sutter's lumber mill at Coloma on January 24, 1848. For the first few years the gold was simply placer mined. After that, hydraulic mining was invented, in 1853, to blast the gold out of the hills with water pressure. It was accomplished by the force of water against the hillsides, loosening dirt and gravel which are washed down over the sluices. Hydraulic mining caused serious silting of the river channels and partial blockage of tributary streams--in addition, damage was done in flood times to farms adjacent to the river.

Finally, Judge Sawyer of the U.S. Circuit Court restrained a company from discharging debris into the river in 1884 (Hydraulic mining was not illegal but the discharge of debris was illegal.) Many mines closed after this injunction.

There was another Bonanza that affected California and especially Sacramento a few years after the initial Gold Rush in 1849. A scant ten years later, on July 1, 1859, the Comstock Lode discovery was made public. Sacramento became the supply depot with the Nevada Territory as the recipient:

There are no records to indicate even approximately the amount of travel between the



Sacramento and Carson Valleys, but there are occasional glimpses into the magnitude of this trade afforded by interested observers. A railroad agent sent to investigate this very question stationed himself along the road during the busy fall trade between August 16 and October 10, 1862. He counted 4,000 teams of 22,000 animals hauling 10,000 tons over Johnson Pass, or an average of 74 teams a day. This meant, in effect, that a team of six to ten horses or mules left Placerville every ten minutes during daylight hours. — McGowan, *History of Sacramento Valley*, p. 180.

Mercantile and Agricultural Economy

In 1849 very little was produced in California and nearly everything imported. In the dry periods the miners worked, spending the winters in Sacramento or San Francisco. Hence late rains caused temporary depressions in these cities and limited the freight carried by steamers. Fires and floods influenced the market as well.

Rate cutting by the different companies influenced the amount of freight carried by the steamers--merchants were often reluctant to buy or ship goods, fearing that lower freight rates would enable competitors to undersell them.

Sacramento herself greatly profited from the commerce coming upriver. Steamers paid the city \$150.00 a month, plus tonnage dues of 8 cents a ton, to unload their cargo at storeships along the levee.

Changing Physical Character of River and Environs.

During the winter of 1849-50, U.S. Navy Commander Cadwalader Ringgold made a survey of the Sacramento River to produce the first reliable navigation charts and sailing directions.

Floods were commonplace in Sacramento. There were four separate floods from December 1861 to spring 1862. There were few levees; those that existed were only a few feet high, and Sacramentans were not prepared for the deluges that occurred.

The floods of 1861-62 was that much of downtown Sacramento was raised from four to fourteen feet. The final raising was determined by a measurement known as "above overflow" (the highest known level of flood waters). As a result, excavations in downtown Sacramento show an "extra" basement, and those unfamiliar with Sacramento History are willing to believe in the myths that have been circulated about the uses of these "cellars".

The floods of 1861-62 intensified the need for more, higher, and better levees. But the problem with flooding was worsened by the



fact that debris from hydraulic mining was now raising the bed of streams, which required higher levees. Steamboat captains had noticed as early as 1855 that parts of the river channels were more shallow than in previous years, but generally people were not aware until the floods of the early sixties. Another 14 years passed before hydraulic mining was restricted.

Steamboat Slough, 12 feet deep in 1853, was five feet deep in 1879, and was abandoned as a customary waterway from steamboats. The river had to be dredged.

In 1864 dredging was done by attaching plows to the stern of a steamer. Thus was the sediment loosened, to float away, downriver to the next snag. On March 20, 1866, the city levied a tax of 15 cents on each \$100 in cargo. The funds collected were used to deepen the channel, which was filled with so much silt that ships could not tie up at the shore.

Types of Vessels on the River

By April 1848 in response to the horde of gold seekers, a launch was being run between Marysville and San Francisco. Unlike Sutter's launches, which were run primarily for his business, this service met the needs of farmers and ranchers bordering the Sacramento and its tributary.

In 1849 large sailing vessels were still able to ascend to Sacramento where a sand bar obstructed the river. It also offered excellent anchorage. Because their crew almost immediately left for the mines, these ships were used as warehouses, stores and boarding houses.

As the Sacramento River was very crooked it was necessary to warp the vessels with a rope attached to a tree. The passengers, as was expected during this period, assisted in the work. Sometimes the rigging became entangled in tree branches. Their progress of boats was also impeded by sunken and floating snags in the river.

— Dyke, *Transportation in the Sacramento Valley*,
p. 4.

The bark, *Whiton*, under Captain Gelston was the first ship to sail to Sacramento directly from the Atlantic states. As early as July 1849 these and other large boats were charging an ounce of gold for passage to Sacramento.

A journey to Sacramento in the early gold rush took anywhere from ten days to five weeks, with burning sun, fierce mosquitos and a lack of wind. Navigation for wind driven vessels was tricky. At night these boats anchored due to obstacles of islands. Often passengers were forced to sleep on deck.



Figure 30. A saloon and game room on the Capital. Note the ornate grillwork on the stairs and wood carving throughout.



Figure 31. Interior view of the Riverboat Capital. Note the wicker furniture, the piano and the curtain between the lounge in the background and the lobby area in the foreground, with the individual cabin doors on the left.



Even with these inconveniences and obstacles, die-hard owners of sailing vessels tried to resist the impinging steamers through the early 1850's, but without success.

Steamboats Emerge

The Golden Age of steamboating lasted from 1849-1871. The steamers were either freighted by parts on a sailing vessel to San Francisco Bay and assembled there, or came around the Horn. The first small steamers and scows arrived by this latter means. Some of them had run on eastern rivers.

The larger steamers, river palaces they were called, began to make an appearance. The *McKim* was the first to appear (October 3, 1849) a propeller driven steamer. She made her first trip from San Francisco to Sacramento in 17 hours, 24 hours less than any previous craft.

The *McKim* was an immediate success. One one trip alone she made \$16,000 profit. Rates on the *McKim*:

Cabin passage to Sacramento	\$30.00
Deck passage to Sacramento	20.00
Berth passage to Sacramento	5.00
Meals (cabin passengers only)	1.50
SF to Benicia	15.00
Heavy freight per 100 #	2.50
Measurement of goods per foot	1.00

—McGowan, *Sac to SF Shipping*, p. 47

Although the *McKim* was large it cannot be classed with the floating palaces. The first of these was the *Senator* which arrived in San Francisco on October 27, 1849. On a trip to Sacramento it completed the trip in 11 hours.

Though the *McKim* was profitable, The *Senator* held the distinction for making more money than any other boat built in the United States.

On July 11, 1850 the first large steamer built expressly for the California trade steamed into San Francisco Bay. The *New World* was built in New York.

On January 22, 1851 the *New World* sped down the river in an unbelievable 7 hours, cutting the old time in half. This was to start a rivalry in racing which was to hold the public's interest.

Together with the *Senator*, the *New World* ran what was known as the People's Line--they set the first daily communication with the mining depot of Northern California with large



comfortable speedy boats. They made the trip either way in about eight hours.

July 1850--another large steamer, *Major Tompkins*--used during the Mexican War as a transport. It competed with the *New World* and *Senator* by lowering rates--also the *Tompkins* advertised that it would pick up freight at any point on the beach or harbor.

Although on the Mississippi it was the card sharp who was most actively resented, on the Sacramento it was the petty thief who most frequently met with frontier justice. On the *Senator* one day a fellow was caught stealing a pair of shoes from a Chinaman but was released upon returning them. Later, when he was caught stealing five dollars which had just been placed on the bar, he was taken forward to the windlass and given 36 lashes before being put ashore.

—McGowan, *Sacramento SF Shipping*, p. 63.

Steamboat Slough was an especially bad place for steamers coming upriver. Sometimes the steamers, negotiating a broad turn poked her nose into the thickets on the bank.

Light Draught Steamers:

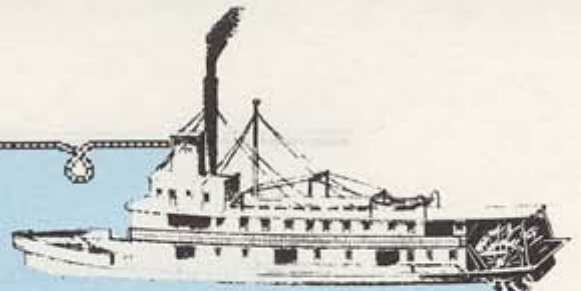
The summer of 1850 saw the need for light-draught steamers to carry freight and passengers from Sacramento to Marysville or further upstream where streams were 2-3 feet deep. By 1852 and 1853, the number and rivalry of the of the larger steamers minimized the effectiveness of these smaller boats except in dry seasons.

Although the larger floating palaces were the major factor in the development of the river navigation, the smaller steamers and scows provided service in communicating with the mines. First, the scows lessened dependence of wind and tide in supplying the mines. They also acted as ferries across the river, mining dredges or farm produce carriers.

These small inland steamers eagerly competed for the bits of business that the larger steamers couldn't or wouldn't supply. They shipped produce to market while the bigger steamers had the monumental task of supplying the mines.

Of the light-draught steamers the most effective was the *Gov. Dana* (First run April 14, 1850.) She was assembled at New York on the Pacific; *Jack Hayes* (formerly *Commodore Jones*); *Fawn*.

Because of the increased freight, the barge came to the Sacramento River in 1856. They were large flat-bottomed scows



A SINGULAR CAPTAIN

The men who piloted the Sacramento River were selfless and responsible-necessary qualities for those in whom scores of passengers placed their fate - but there were a few bad apples. Passengers aboard the Continental complained to the newspapers of one captain's abandoning ship in the midst of a fire:

"We consider it our duty to inform the public of what we were witness to, viz: That when the fire went out the Captain lost entirely his presence of mind and cried "Every man for himself" or words to that effect. There was a rushing for the boats, when one of the passengers called the Captain's attention to the fact that the sea was going too high for the safety of any boat. He then ordered us to wait until morning, when he personally left in the third boat, leaving the other passengers to care for themselves. The steamship remained twenty-three hours or more afloat before she sank, and there would consequently have been plenty of time for lightening her or for building a raft to save the remaining passengers, the specie and the correspondence."

— *Sacramento Union*, October 22, 1870





with quadruple rudders. The pilot house which was raised on stilts allowed the helmsman to see ahead to maneuver tight turns.

On February 22, 1854, the owners of all steamers on San Francisco Bay, the Sacramento, San Joaquin, Feather and Yuba River formed a joint stock company known as California Steam Navigation Co.

A dozen owner captains and their bankers sat down and brought forth the CSNC. It was thought that it would be a monstrous monopoly that would crush the opposition and bleed the public with high tariffs. It did nothing of the sort--it brought order out of chaos and stabilized rates.

The appearance in 1855 of the *Defender*, and opposition boat, caused considerable excitement, and competition was strong. One one occasion the *Defender*, finding no place to land at Sacramento, moored to the hulk *Damon*. When the time for departure came, the band played to entice passengers on boat. A few minutes afterwards a small steamer began to sound a whistle, drowing out the music of the band, stopping when it stopped and starting when the band did. Soon a man and two boys with Chinese gongs essayed to rival the band and the steamer, making so much noise that court being held by Judge Morrison in Sacramento had to be adjourned.

—Dyke, *Transport*..., p. 11-12.

Marysville organized their own company--Citizens Steam Navigation Co. Their interests centered around the large steamer *Queen City* soon joined by the large stern-wheeler *Young America*. Both companies lost much money; a compromise was reached where the *Queen City* was subsidized by the CSNC.

The California Steam Navigation Co. dominated the river until it was transferred to Central Pacific RR in 1871. There was almost continual opposition to the monopoly. It ran mostly below Sacramento.

Because of speed, a steamer could carry as much freight to Sacramento in a month as 400 sailing crafts.

The development of agriculture after 1860 stimulated the steamboat companies to stop at every farmer's landing to pick up cargo.

Steamboating on the Feather River was more important than on the Sacramento until 1869. Steamboats stopped using it after 1869 when the RR arrived. The Marysville Steam and Navigation organized in 1874 went into competition against the high freight rate charged by the RR's. The steamboat line charged \$3 a ton where the railroad charged \$5.25.



Fruit farmers used 2 sailing vessels in 1864 to take their produce to San Francisco, making two round trips per month. But this was too slow as the fruit ripened quickly. They hired in turn the little steamer, *Reform*, to move freight. From this sprang the California Transportation Co., formed in 1875, which provided a 48-hour round trip service to San Francisco for landings between Rio Vista and Clarksburg. It sometimes touched as many as 65 different landings. There were several hundred landings below Sacramento--some made of timbers, others of brush. The steamboats stopped at smaller landings only on signal.

Though the RR carried most of the freight after 1861, the growth of the valley made it possible for the steamboats to increase their business.

Small independent owners found a place for themselves as well. One of the first was the Sacramento Wood Co., organized by steamboat captain, Captain Thomas Dwyer. He bought land adjacent to the river and cut wood, then ran his steamship *San Joaquin #1* from this. In 1869 Dwyer formally organized Sacramento Wood Co. Its name was changed in 1879 to Sacramento Transportation Co.

A public service type steamboat on the upper Sacramento after the Civil War was the trading boat. Many people were cut off from towns by tule swamps or distance to the railroad. These people relied on trading boats. The first such trading boat was the *Alta*; also the *Neponset* 1 and 2.

Farmers traded the produce of their fields for all sorts of merchandise which the boats carried. On the return trip the boats were loaded down with poultry, pigs, calves, wild game, garden truck, fruits, hides, dairy products, and anything that could be raised on the low lands.

Deck hands offered another friendly service newspapers or magazines to a stick and throwing it to farmers waiting for the trading boats to pass by. On occasion, some complained that the trading boats sold liquor to farm hands who immediately proceeded to get drunk. In any case, all waited for the trading boat, recognized its characteristic whistle and rushed to the bank to see it pass, or the landing to trade with it.

—McGowan, *History of Sacramento Valley*,
p. 306.

Each steamboat had its own distinctive whistle, and the sound of "your" boat signaled the imminent contact with the outside world. The electric railroad, automobiles, and paved highways added to



the demise of the steamboat. Steamboats above Sacramento were mainly concerned with moving wheat to market until 1901.

The end of the steamboat era on the Sacramento came in October 1941 when the *Delta King* and *Queen* were leased to the U.S. Navy.

Steamboat Fates

The Steamboats met with various fates. Several were lost in a fire in August 1932, two or three were used to repair levee breaks and *Captain Weber* burned at the docks in 1943. Many of the smaller and lesser known boats were converted into barges and later towed by diesel-driven boats.

The first "floating palace" to steam to Sacramento was the *Senator*.

Vessels found it hard to navigate the Feather River but it was every more difficult after 1855 because of the large number of mining ditches that diverted water from the Yuba and Feather Rivers.

Sinkings

The upper Sacramento had always been handicapped by snags and shallow water. The Federal Government tried to help by sending in the *Seizer*, a snagboat, to clear the river in 1881.

In those races a steamboat would leave its moorings--the one that pulled out first would zig-zag to stop the opposing boat from passing. Sometimes the captain would skip Benicia to make time, forcing the passengers to take the next ship back.

Once, in May 1859 passengers of both steamboats, excited by the contest and unfair tactics, drew pistols and began shooting at each other.

Racing was dangerous but soon became the accepted practice. There was no insurance on goods shipped on the upper Sacramento because the rates were prohibitive. —Ostrander, *The Steamboat. Catalytic Element...*

Boiler Explosions

Of all steamboat disasters, boiler explosions did the most damage. *Belle* exploded on February 7, 1856, 11 miles above Sacramento--13 killed and fifteen injured.

The *Pearl* exploded January 27, 1855, at the mouth of the American River, killing about 56 of the 100 passengers. The *Washoe* exploded on September 5, 1864 near Steamboat Slough killing 70 passengers. The *Yosemite* exploded at the wharf



in Rio Vista on October 12, 1865, killing scores of people. These explosions were generally caused by defective iron in the boilers. But by 1870 steam engineering had progressed to the point that few explosions took place.

From the Steamboat Act.....*When a Boiler Bursts:*

To punish criminally in such cases is impossible; for, when such catastrophes occur, it cannot be frequently be told who is most to blame, the captain, the mate, the pilot, or the engineer.

The supervising of the local inspectors can suspend a pilot or an engineer for days or months in succession and thus deprive him of an opportunity of earning a dollar by his business; or revoke his license entirely, and thus compel him, when perhaps on the downfall of life, some other employer.

A Report, pursuant to the provisions of the Steamboat Act, on explosion of the *Pearl*, January 27, 1855:

This accident was investigated most fully, and the decision was, that it was caused by the carelessness or recklessness of the engineer; the boat had been inspected in compliance with the law, but the engineer then in charge was not licensed, a change having been made in the engineer without the knowledge of the inspectors; the previous engineer had been licensed by them. Their engineer in charge would have been prosecuted by the inspectors, but that he absconded after the accident.

Steamboating on the Lower Sacramento still provided, even with all its inconveniences, and with its myriad of hazards, the most expeditious route to the heartland.

